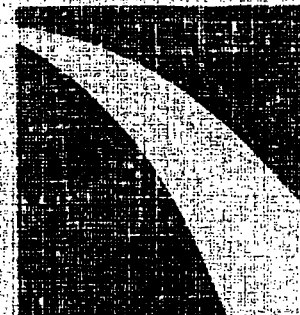
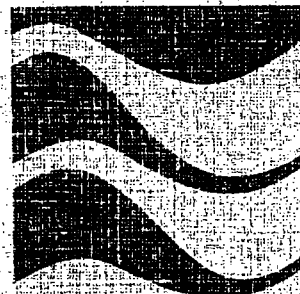
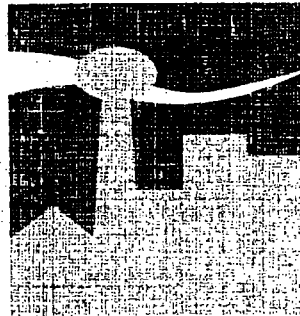
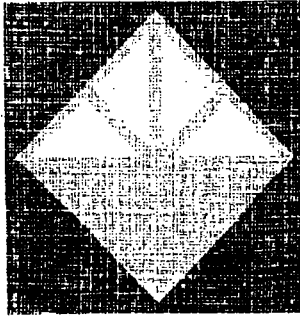


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**UPPER DOLORES RIVER AND
SILVER CREEK BASIN
WATER QUALITY AND DISCHARGE
MONITORING SUMMARY
Rico, Colorado**

July 2002 Sampling Event

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**UPPER DOLORES RIVER AND SILVER CREEK BASIN
WATER QUALITY AND DISCHARGE MONITORING SUMMARY
RICO, COLORADO**

1.0 Introduction

This report includes water quality sampling results and discharge measurement results from the Silver Creek and upper Dolores River basins near the Town of Rico, Colorado. Water Quality samples were collected July 14-19, 2002 from the St. Louis tunnel discharge, the St. Louis settling pond system discharge (002), Argentine Tailings seep, an unnamed discharge along Silver Creek, Silver Swan adit discharge, combined Rico Boy and Santa Cruz adit discharges, Santa Cruz wetlands discharge, Columbia Tailings seep, Silver Creek, and the Dolores River. Water flow measurements were performed at each sampling site in conjunction with the water quality sampling. Table 1 lists the sampling station locations and site descriptions. Sampling sites in the Silver Creek basin are illustrated on Figures 1 and 2. Sampling sites in the Dolores River basins are illustrated on Figures 3 and 4. Photos 1-16 are of select sampling locations and site conditions.

**TABLE 1
Sampling Location Summary**

SITE ID	SITE DESCRIPTION
SVS-8	Silver Creek below Argentine tailings
SVS-12	Argentine Tailings seep at source
SVS-20	Silver Creek just above confluence with Dolores River
SVS-22	Silver Creek just above the Argentine Tailings seep
SVS-26	Unnamed adit downstream from the overhead tramway
DR-1-SW	Dolores River side channel/Columbia Tailings seep
DR-2-SW	Dolores River above Columbia Tailings
DR-4-SW	Dolores River below Silver Swan
DR-7-SW	Silver Swan adit
DR-9-SW	Rico Boy/Santa Cruz wetland outlet
DR-1	Dolores River above St. Louis settling pond system
DR-2	Dolores River immediately above St. Louis settling pond system outfall
DR-3	St. Louis tunnel discharge at adit
DR-6	St. Louis settling pond system outfall to the Dolores River (Outfall 002)
DR-7	Dolores River below St. Louis settling pond system outfall
DR-20	Dolores River just west of Pond 14
DR-26	Dolores River between Columbia Tailings seep and Rico Boy/Santa Cruz wetlands
DR-27	Rico Boy/Santa Cruz combined flow

2.0 Methods and Procedures

2.1 Sampling Objectives

Data from the water samples were used to characterize the water quality of the seeps, adit drainages and receiving streams. An objective of this sampling event was to collect and analyze samples from a low-flow event.

2.2 Water Quality and Flow Measurement Sampling Locations

Samples were collected from the St. Louis tunnel discharge, the St. Louis settling pond system discharge, Argentine Tailings seep, Silver Swan adit discharge, combined Rico Boy and Santa Cruz adit discharges, Columbia Tailings seep, the minor discharge downstream of the overhead tramway, Silver Creek, and the Dolores River as shown in Table 1. Samples were collected starting with the most downstream site and progressing upstream.

The Dolores River was sampled below all adit outfalls, just downstream of the Silver Swan adit. It was also sampled between Columbia Tailings and the wetlands adjacent to the Santa Cruz/Rico Boy outlet, and above the Columbia Tailings. The river sampling, when combined with the sampling of the Silver Swan adit, the Rico Boy/Santa Cruz combined flow, the Columbia Tailings seep, and Silver Creek above the confluence, provides a basis for assessing the affect of those discharges on the water quality of the Dolores River.

The Santa Cruz wetlands west outlet (DR-10-SW), which is the discharge from the small pond receiving the combined Rico Boy/Santa Cruz flows, was dry. The pond was several feet below the level of the overflow spillway and the channel from the pond to the Dolores River was dry. The Santa Cruz wetland east outlet (DR-9-SW) was sampled instead of DR-10-SW.

The affect of the St. Louis ponds system on the Dolores River was monitored by taking four samples from the Dolores River as identified in Table 1. In addition, samples were collected from the tunnel discharge and discharge 002.

To provide a basis for assessing water quality impacts to Silver Creek, the Creek was sampled above and below the Argentine Tailings seep. Also, the Argentine Tailings seep was sampled at its source, as was the minor discharge downstream of the overhead tramway.

Flow measurements were taken at all locations where water quality samples were collected. The exception to this is that no flow measurement was taken in the Dolores River along Pond 14 (DR-20).

2.3 Sampling and Analysis Parameters and Methods

Water samples were analyzed for pH, temperature, conductivity, alkalinity, hardness, total dissolved solids (TDS), total suspended solids (TSS), plus the trace metals arsenic, cadmium, chromium, copper, cyanide, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc.

The following parameters/analysis were completed at the various sites:

- Arsenic - total recoverable only at point sources
- Cadmium, Copper, Manganese, and Zinc – dissolved at all sampling stations, plus total recoverable at the St Louis tunnel and potentially dissolved at the pond system discharge
- Chromium - Total recoverable at all sampling stations
- Iron – total recoverable at all sampling stations, and dissolved at the St Louis tunnel and pond system discharge
- Lead, Nickel, Selenium, and Silver – dissolved at all sampling stations plus potentially dissolved at the St Louis tunnel and pond system discharge
- Cyanide –Low-Level WAD at all sampling stations
- Mercury – Total at: Argentine Seep, Santa Cruz/Rico Boy, Silver Swan, St Louis tunnel, Dolores above St Louis Ponds, Dolores below St Louis Ponds (above Silver Creek), Silver Creek above confluence

Sampling was conducted in accordance with the sampling program used for the Rico site remediation. Lab-certified plastic bottles were used to collect sample water for hardness, TDS, and TSS analyses. Sample water for dissolved metals analysis was first collected in a clean plastic bottle, and within ten minutes, filtered through a 0.45µm filter into a sample bottle containing nitric acid preservative. Sample water for total recoverable metals analysis was collected without filtration in a sample bottle containing nitric acid preservative. Sample water for potentially dissolved metals analysis was collected without filtration in a sample bottle containing nitric acid preservative. Sample water for low-level mercury analysis was collected without filtration using the “clean hands/dirty hands” method (EPA Method 1631) into double wrapped, laboratory prepared glass bottles. All mercury samples were collected on the same day and shipped overnight to the laboratory. For quality control purposes, one duplicate sample and one field blank were included in addition to the 18 water quality samples submitted to the laboratory for analysis.

Field parameters were measured at the time of sample collection. Field measurement data for pH, temperature, conductivity, and alkalinity were recorded in a logbook. The pH meter was calibrated each morning using standard solutions and in accordance with manufactures instructions. Weather parameters including temperature and precipitation were recorded in the logbook. Copies of all field records are provided in Appendix A.

All sample bottles were labeled to identify site name/number, date and time of collection, and type of analysis. In addition, sample analysis/chain of custody forms were completed and processed at the time of sample collection. Original chain of custody forms were signed, dated, and placed in the sample shipment container prior to sealing the container for shipment. Copies of all chain of custody forms are provided in Appendix A.

2.4 Water Quality Analytical Procedures

All water samples were placed in a cooled container and sent to ACZ Laboratories, Inc. in Steamboat Springs, Colorado. Sample analyses were performed according to methods specified in 40 CFR, Part 136 or other methods approved by EPA. Laboratory methods and reporting limits for all parameters are presented in Table 2.

Laboratory results were supported by sufficient backup data and quality assurance results to enable reviewers to conclusively determine the quality of the data. The full analytical report package (Appendix B) includes reference to the analytical methods used, detection limits, and quality control data.

TABLE 2
Analytical Procedures Summary

Parameter	Method Detection Limit (MDL) ¹	Practical Quantitation Limit (PQL) ²	Method
Field Parameters			
pH (s.u.)	---	---	EPA 150.1
Temperature (°C)	---	---	Standard Method 2550
Conductivity (µmhos/cm)	---	---	EPA 120.1
Alkalinity (mg/L as CaCO ₃)	1 mg/L	5 mg/L	EPA 310.1
General Parameters			
Hardness (as CaCO ₃)	1 mg/L	7 mg/L	SM 2340 B
Total Dissolved Solids (as TDS)	10 mg/L	20 mg/L	M160.2 Gravimetric
Total Suspended Solids (as TSS)	5 mg/L	20 mg/L	M160.2 Gravimetric
Trace Metals			
Arsenic	0.5 µg/L	3 µg/L	M200.8 ICP-MS
Cadmium (as Cd)	3 µg/L	20 µg/L	M 200.7 ICP
Chromium	0.1 µg/L	0.5 µg/L	M200.8 ICP-MS
Copper (as Cu)	1 µg/L	5 µg/L	M200.8 ICP-MS
Cyanide	5 µg/L	10 µg/L	SM4500-CN I-Colorimetric w/distillation
Iron (as Fe)	10 µg/L	50 µg/L	M200.7 ICP
Lead (as Pb)	0.2 µg/L	1 µg/L	M200.8 ICP-MS
Manganese (as Mn)	5 µg/L	30 µg/L	M200.7 ICP
Mercury	0.0002 µg/L	0.0005 µg/L	M1631 Atomic Fluorescence
Nickel	10 µg/L	50 µg/L	M200.7 ICP
Selenium	3 µg/L	20 µg/L	M200.8 ICP-MS
Silver (as Ag)	0.1 µg/L	0.5 µg/L	M200.8 ICP-MS
Zinc (as Zn)	10 µg/L	50 µg/L	M200.7 ICP

1 – MDL – Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations

2 – PQL – Practical Quantitation Limit, typically 5 times the MDL

2.5 Discharge Measurement Procedures

Discharge measurements were conducted in accordance with the measurement procedures used for the Rico site remediation as well as USGS standard discharge measurement procedures. Flows were measured by one of four methods (1) six-tenths-depth method using a Marsh-McBirney Model 2000 portable flow meter, (2) Parshall flume, (3) volumetric procedure using a 5-gallon bucket, or (4) floating stick method.

The six-tenths-depth method (for depths between 0.3 feet and 2.5 feet) was selected for the flow meter measurements. This method uses the velocity at six-tenths of the depth as the mean velocity in the vertical direction. This method is generally reliable between depths from 0.3 feet to 2.5 feet. The first step in the measurement procedure was selecting a stream section with the desired characteristics of: parallel flows, smooth streambed with minimal obstructions, a straight channel, and a flat streambed. The best possible section was selected using these criteria. After selecting the stream section, a measuring tape was stretched across the stream section, perpendicular to the flow, and anchored at both ends. The width of the section was determined and divided into several (10 to 20) vertical sections. Flow measurements of velocity (by the six-tenths-depth method) and water depth were measured at each vertical section using the Marsh-McBirney flow meter and wading rod assembly. The flow meter was set to the 10 second fixed period average mode. Three velocity readings were recorded at each vertical section. Flows were calculated for each stream section using the water depth, horizontal distance, and averaged velocity data. The flow meter measurements were recorded in a logbook (Appendix A) and the discharges calculated on field data sheets (Appendix A).

The Argentine Seep, St. Louis tunnel flow, and St. Louis Pond discharge 002 each have a Parshall flume installed. Water depth measurements were taken at the appropriate location in the flume. The flow rate was then determined from a flume rating table.

The volumetric procedure was used at the combined Rico Boy/Santa Cruz flow, and the unnamed seep downstream of the overhead tramway. Volumetric field measurements consist of leaving a 5-gallon bucket under each discharge for a known length of time and measuring the water depth in the bucket at the end of the time. The volumetric trials were averaged to determine the flow rate (in gallons per minute) at each station. The volumetric trials were recorded in a logbook.

The floating stick method was used at the Silver Swan adit, and the Santa Cruz wetlands outfall. The floating stick method is used where flow levels are too low and the channel too flat for any of the previous methods. This method consists of finding a uniform channel section, and measuring the length, width and depth of the section. A small twig is then dropped on the water and the time required for the twig to travel the length of the section is recorded. Several trials were performed and an average velocity for the surface of the water was determined. From this average velocity and the cross-sectional area a flow rate was calculated. This method likely allows the greatest potential for error in flow estimation.

3.0 Results and Discussion

3.1 Water Quality Results and Discussion

3.1.1 pH

pH was measured at all sites during the July and October sampling events. The same procedures and equipment were used for both sampling events. A QA review completed after the October event identified readings that were inconsistent between the two events and, upon historical review, with past readings. Further investigation led to the conclusion that the pH meter had not been functioning properly during either sampling event. Testing performed on the unit as directed by the equipment manufacturer confirmed that the sampling probe was not working properly. Therefore all pH data has been deemed suspect and is not presented in this report.

3.1.2 Results and Discussion

Silver Creek Basin. Analyses results from samples collected in the Silver Creek Basin on July 18-19, 2002, are provided in Table 3.

The leaking cofferdam in the Blaine Tunnel portal was sealed on July 27, 2001. No flow was observed exiting the portal during the July field visit.

A collapsed adit discharge (SVS-26) was found on the south side of Silver Creek, approximately 0.8 miles downstream from the Blaine adit as part of an effort to identify any seeps/discharges in the vicinity downstream of the Blaine adit. This location is slightly downstream from where the overhead tramway cables cross the Argentine Tailings access road. This seep was found by walking downstream along Silver Creek from the Blaine Adit until this discharge was located. No other seep or discharge was found on the south side of the creek and no seep or discharge, other than the Argentine Tailings seep, was found on the north side of the creek.

TABLE 3
Silver Creek Basin Analysis Results (July 18-19, 2002)

Parameter	Units	SVS-22 Silver Creek above Argentine Tailings seep	SVS-12 Argentine Tailings seep	SVS-8 Silver Creek below Argentine Tailings	SVS-26 Discharge Downstream of overhead tramway	SVS-20 Silver Creek just above Dolores River
Date Sampled		7/18/2002	7/18/2002	7/18/2002	7/19/2002	7/18/2002
Time of Flow measurement		12:30 pm	10:30 am	10:05 am	≈11:45 am	7:55 am
Time Water Quality Sample Collected		12:50 pm	11:00 am	9:25 am	12:20 pm	8:30 am
Field Parameters /						
Flow	gpm	158	24	169	2.1	78
Temperature	°C	9.2	7.4	9.2	6.9	10.1
Conductivity	µmhos/cm	191.3	733	326.8	441.6	377.4
Alkalinity	mg/L as CaCO ₃	90	155	na	55	153
General Parameters						
Hardness	mg/L as CaCO ₃	144	751	329	403	352
Total Dissolved Solids	mg/L as TDS	180	1010	370	630	420
Total Suspended Solids	mg/L as TSS	U	8	6	6	U

na – not analyzed

U – Analyte was analyzed for but not detected at the minimum detection limit (MDL)

TABLE 3 (cont.)
Silver Creek Basin Analysis Results (July 18-19, 2002)

Parameter	Units	SVS-22 Silver Creek above Argentine Tailings seep	SVS-12 Argentine Tailings seep	SVS-8 Silver Creek below Argentine Tailings	SVS-26 Discharge Downstream of overhead tramway	SVS-20 Silver Creek just above Dolores River
Dissolved Trace Metals						
Cadmium	µg/L as Cd	4	4	3	16	4
Copper	µg/L as Cu	2	2	2	51	2
Cyanide	mg/L as CN	U	U	U	U	U
Lead	µg/L as Pb	0.5	1.7	U	40.7	0.5
Manganese	µg/L as Mn	U	7200	648	10800	12
Nickel	µg/L as Ni	U	20	U	U	U
Selenium	µg/L as Se	U	U	U	U	U
Silver	µg/L as Ag	U	U	U	U	U
Zinc	µg/L as Zn	420	6110	940	8050	470
Total Recoverable Trace Metals						
Arsenic	µg/L as As	na	0.8	na	U	na
Chromium	µg/L as Cr	U	U	0.1	U	U
Iron	µg/L as Fe	U	5780	90	14800	10
Total						
Mercury	µg/L as Hg	na	U	na	na	U

H – Analysis exceeded method hold time

na – not analyzed

U – Analyte was analyzed for but not detected at the minimum detection limit (MDL)

Dolores River Basin. Samples from the Upper Dolores River Basin were collected on July 14-19, 2002. Results from Dolores River samples are presented in Table 4 on the following page.

During QA review initial test results for hardness, manganese, and zinc for the Dolores River below Silver Swan (DR-4-SW) appeared inconsistent with other results for the Dolores River. Accordingly, the sample was retested for these parameters. The laboratory identified a dilution factor error in the initial hardness analysis and that result was discarded. The retest result is presented in Table 4. Both sets of data for manganese and zinc are presented in Table 4.

TABLE 4 .Upper Dolores River Analysis Results (July 18-19, 2002)

Parameter	Units	DR-1	DR-20	DR-2	DR-7	DR-2-SW	DR-1-SW	DR-26	DR-9-SW	DR-27	DR-7-SW	DR-4-SW
		Dolores River above St. Louis Ponds	Dolores River just west of Pond 14	Dolores River above Outfall	Dolores River below St. Louis Ponds	Dolores River above Columbia Tailings	Dolores River side channel/ Columbia Tailings seep	Dolores River between Columbia Tailings seep and Rico Boy/Santa Cruz wetlands	Rico Boy/Santa Cruz wetland outlet	Rico Boy/Santa Cruz combined flow	Silver Swan adit	Dolores River below Silver Swan
Date Sampled		7/19/2002	7/19/2002	7/17/2002	7/16/2002	7/15/2002	7/17/2002	7/14/2002	7/17/2002	7/16/2002	7/16/2002	7/14/2002
Time of Flow measurement		9:45 am	na	6:20 pm	12:30 pm	1:40 pm	12:40 pm	6:40 pm	≈9:00 am	10:10 am	8:00 am	3:10 pm
Time Water Quality Sample Collected		10:10 am	8:40 am	5:50 pm	12:10 pm	1:40 pm	11:45 am	6:40 pm	9:00 am	10:45 am	8:40 am	3:25 pm
Field Parameters												
Flow	gpm	4822	na	6478	6346	6689	21.3 A	4649	20	32	16	6210
Temperature	°C	11.5	10.1	16.1	14.7	17.4	16.9	16.4	14.6	19.9	13.3	18.5
Conductivity	µmhos/cm	185.8	196.1	288.9	345.1	359.7	383.2	355.8	551	1169	995	380.6
Alkalinity	mg/L as	99	105	98	120	82	128	83	326	657	467	78
General Parameters												
Hardness	mg/L as CaCO ₃	134	148	221	242	249	259	250	425	942	1040	290
Total Dissolved Solids	mg/L as TDS	190	210	240	320	330	340	330	540	1160	1240	340
Total Suspended Solids	mg/L as TSS	U	U	10	6	U	10	U	12	10	30	8
Dissolved Trace Metals												
Cadmium	µg/L as Cd	3	U	U	U	U	U	U	U	U	U	U
Copper	µg/L as Cu	U	U	2	1	2	3	1	2	10	2	1
Cyanide	mg/L as Cn	U	U	U	U	U	U	U	U	U	U	U
Lead	µg/L as Pb	U	U	0.3	U	0.2	U	U	U	U	1.3	U
Manganese	µg/L as Mn	13	79	307	316	210	188	229	9060	86	2690	21/U C
Nickel	µg/L as Ni	U	U	U	U	U	U	U	U	U	U	U
Selenium	µg/L as Se	U	U	U	U	U	U	U	U	U	U	U
Silver	µg/L as Ag	U	U	U	U	U	U	U	U	U	U	0.2
Zinc	µg/L as Zn	20	20	20	20	50	580	80	40	920	880	10/30 C
Total Recoverable Trace Metals												
Arsenic	µg/L as As	na	na	na	na	na	U	na	na	U	5.1	na
Chromium	µg/L as Cr	U	0.1	0.1	1.7	1.3	U	1.4	U	U	1.5	1.4
Iron	µg/L as Fe	50	90	90	170	120	530	160	1690	10	14700	120
Total												
Mercury	µg/L as Hg	U	na	na	U	na	na	na	na	U	U	na

A – Flow exiting side channel, not the seep

B – calculated from Total Recoverable Iron minus Iron II

C – Samples were retested, both results shown. The initial test result is the first number, the retest is the second number

H – Analysis exceeded method hold time

na – not analyzed

U – Analyte was analyzed for but not detected at the minimum detection limit (MDL)

St. Louis Settling Pond System. Sample results from the St. Louis tunnel settling pond system are presented in Table 5. Samples were collected at the St. Louis tunnel discharge at the adit (DR-3, Photo 9), and Outfall 002 (DR-6).

All tested metals showed a significant reduction in concentration from the tunnel to the outfall.

TABLE 5
St. Louis Tunnel Settling Pond System Analysis Results (July 18-19, 2002)

Parameter	Units	DR-3 Tunnel Discharge	DR-6 Outfall 002
Date Sampled		7/16/2002	7/16/2002
Time of Flow measurement		2:05 pm	1:30 pm
Time Water Quality Sample Collected		2:05 pm	1:30 pm
Field Parameters			
Flow	gpm	420	91.6
Temperature	°C	20.1	16.7
Conductivity	µmhos/cm	985	1057
Alkalinity	Mg/L as CaCO ₃	94	166
General Parameters			
Hardness	mg/L as CaCO ₃	742	925
TDS	mg/L as TDS	1120	1350
TSS	mg/L as TSS	46	16
Dissolved Trace Metals			
Cadmium	µg/L as Cd	13	U
Copper	µg/L as Cu	20	3
Cyanide	µg/L as Cn	U	U
Iron	µg/L as Fe	2630	30
Lead	µg/L as Pb	16.7	U
Manganese	µg/L as Mn	2050	505
Mercury	µg/L as Hg	U	na
Nickel	µg/L as Ni	U	U
Selenium	µg/L as Se	U	U
Silver	µg/L as Ag	U	U
Zinc	µg/L as Zn	3430	410

na – not analyzed

U – Analyte was analyzed for but not detected at the minimum detection limit (MDL)

TABLE 5 (cont.)
St. Louis Tunnel Settling Pond System Analysis Results (July 18-19, 2002)

Parameter	Units	DR-3 Tunnel Discharge	DR-6 Outfall 002
Potentially Dissolved			
Cadmium	µg/L as Cd	na	15
Copper	µg/L as Cu	na	2.8
Lead	µg/L as Pb	16	0.7
Manganese	µg/L as Mn	na	506
Nickel	µg/L as Ni	U	80
Selenium	µg/L as Se	U	U
Silver	µg/L as Ag	0.10	U
Zinc	µg/L as Zn	na	450
Total Recoverable Trace Metals			
Arsenic	µg/L as As	1.7	U
Cadmium	µg/L as Cd	18	na
Chromium	µg/L as Cr	9.8	1.6
Copper	µg/L as Cu	250	na
Iron	µg/L as Fe	13900	390
Manganese	µg/L as Mn	2160	na
Zinc	µg/L as Zn	3280	na

na – not analyzed

U – Analyte was analyzed for but not detected at the minimum detection limit (MDL)

3.2 Discharge Measurement Results and Discussion

Flow measurement results from the Silver Creek Basin, the Dolores River, and the St. Louis settling pond system for all sampling during July 2002 are provided in Table 6. The sites are listed in order of upstream to downstream and include the measurement method used for each. In addition to Table 6, sampling site locations in the Silver Creek and Dolores River basins are illustrated on Figures 1 through 4. Appendix A2 contains the field sampling and stream flow measurement forms.

The accuracy of flow measurements taken in the Dolores River is thought to be affected adversely by the presence of relatively large rocks and comparatively shallow flows. The apparent decrease in flow at DR-26 is likely not valid. Results may also have been affected by measuring on different days, and at different times of the day.

DR-1-SW is in a Dolores River side channel adjacent to the Columbia Tailings. There was flow from the Dolores River entering the upstream end of the side channel, no surface discharge from the Columbia Tailings to the side channel, and surface flow out of the side channel into the Dolores River main stem. Flow measurements were taken at the upstream and downstream ends of the side channel. Flow measurement calculations (shown in Appendix A2) indicate that flow at the upstream end of the side channel was 14.8 gpm, and flow at the downstream end of the side channel was 21.3 gpm. Assuming no additional losses or gains from groundwater or other Dolores River flow, the seep would have a potential flow of 6.5 gpm.

The length of Silver Creek from the Blaine adit to about 0.8 miles downstream was walked during the search for the seep/discharge along the south side of Silver Creek. It was observed that the creek was running at the adit and downstream for several hundred feet. Approximately three-quarters of the way along Pond 1 (Pond 1 being the uppermost pond) of the Argentine Tailings the creek ran dry. It remained dry for several hundred feet and resurfaced just upstream of the Argentine Tailings seep. Additionally, there are now two man-made pools in Silver Creek, just above the Argentine Tailings seep. One pool is shown in Photo 2. Rocks have been placed and piled across the creek to form a permeable wall. The rocks were not present during the previous sampling event, and are not iron stained as are the other rocks in the creek. The reason for the pools and who constructed them is not known.

Flow was evident out of the collapsed Silver Swan adit. A lined ditch conveyed flow from the adit to a small pond on the site. While there was flow into the pond, the pond had a very low water level, well below the overflow weir (Photo 16).

TABLE 6
Discharge Measurement Results (July 18-19, 2002)

Site ID	Site Description	Measurement Method	Flow July
Silver Creek Basin		(gpm)	
SVS-22	Silver Creek just above the Argentine tailings seep	Flow meter	158
SVS-12	Argentine tailings seep at source	Flume	23.7
SVS-8	Silver Creek below Argentine tailings	Flow meter	169
SVS-26	Unnamed seep downstream from the overhead tramway	Volumetric	2.1
SVS-20	Silver Creek just above confluence with Dolores River	Flow meter	78.5
Dolores River		(cfs)	
DR-1	Dolores River above St. Louis settling pond system	Flow meter	10.7
DR-20	Dolores River just west of Pond 14	<i>Not Measured</i>	---
DR-2	Dolores River immediately above St. Louis settling pond system outfall	Flow meter	14.4
DR-7	Dolores River below St. Louis settling pond system outfall	Flow meter	14.1
DR-2-SW	Dolores River above Columbia Tailings	Flow meter	14.9
DR-1-SW	Dolores River side channel/Columbia Tailings seep	Flow meter	0.048
DR-26	Dolores River between Columbia Tailings seep and Rico Boy/Santa Cruz wetlands	Flow meter	10.4
DR-9-SW	Rico Boy/Santa Cruz wetlands outlet	Floating Stick	0.044
DR-27	Rico Boy/Santa Cruz combined flow	Volumetric	0.071
DR-7-SW	Silver Swan adit	Floating Stick	0.036
DR-4-SW	Dolores River below Silver Swan	Flow meter	13.8
St. Louis Settling Pond System		(gpm)	
DR-3	St. Louis tunnel discharge at adit	Flume	420
DR-6	St. Louis settling pond system outfall to the Dolores River (Outfall 002)	Flume	91.6

FIGURES

- | | |
|----------|---|
| Figure 1 | Upper Silver Creek Basin Site Location Map |
| Figure 2 | Location of SVS-8, SVS-20, and SVS-26 |
| Figure 3 | St. Louis Settling Pond System |
| Figure 4 | Dolores River Corridor – Sampling Station
Location Map |

projects\rico\2002 Tasks\Task 11 - Sampling & Flow Meas\rc-sc-map.dwg REVISION: 10/3/2002

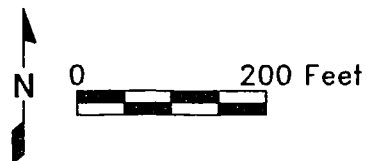
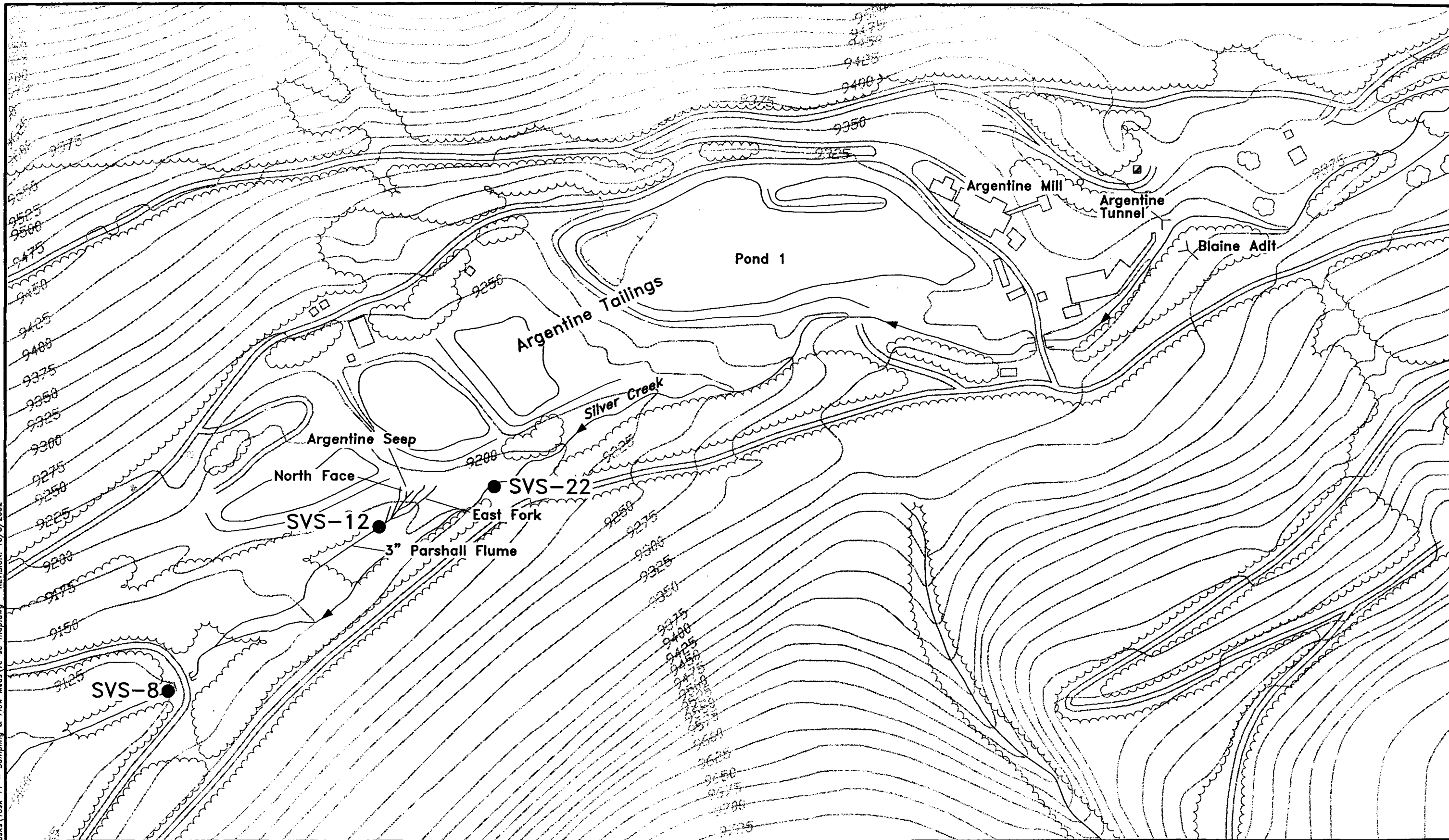
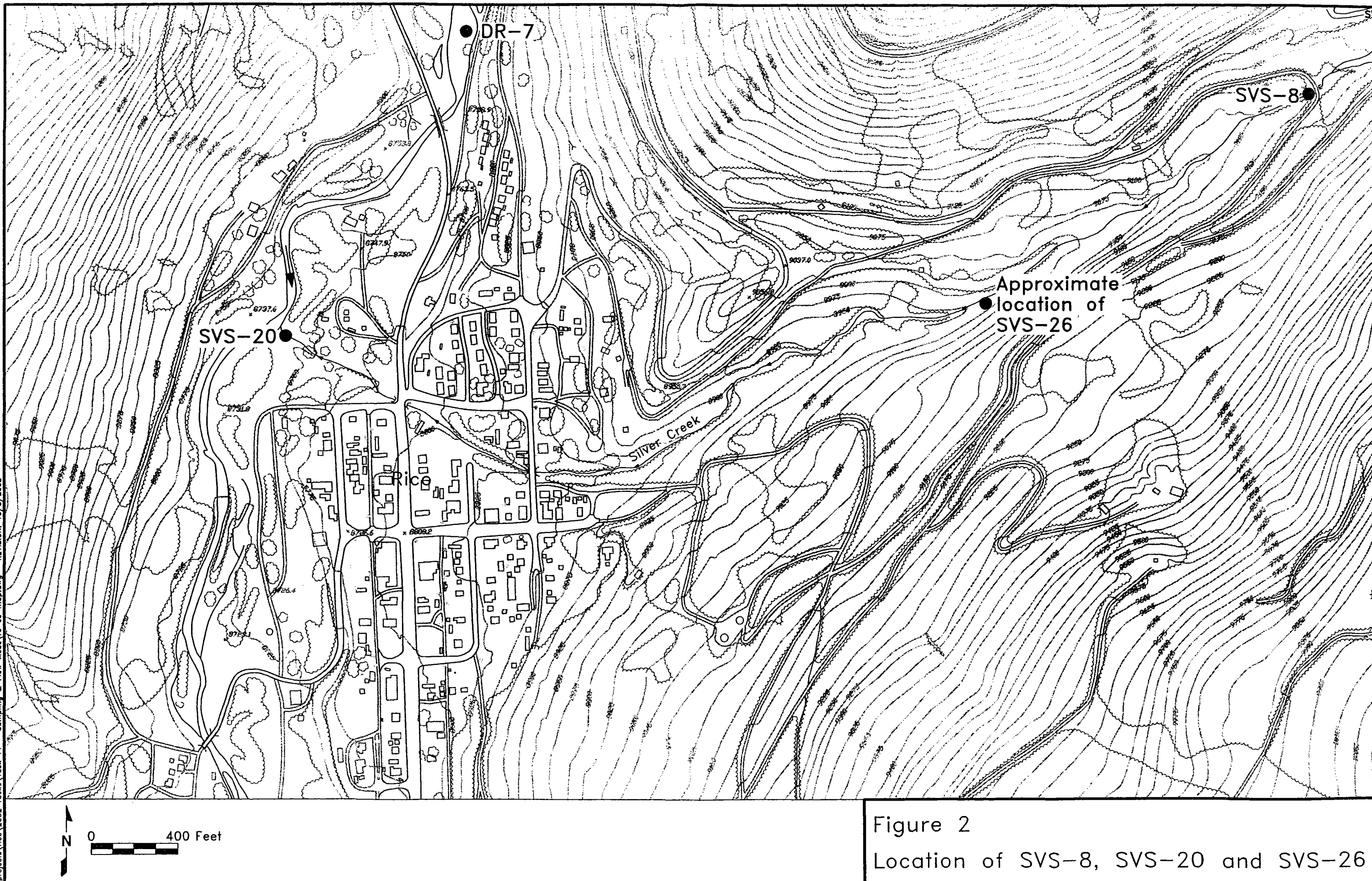


Figure 1
Upper Silver Creek Basin Site Location Map



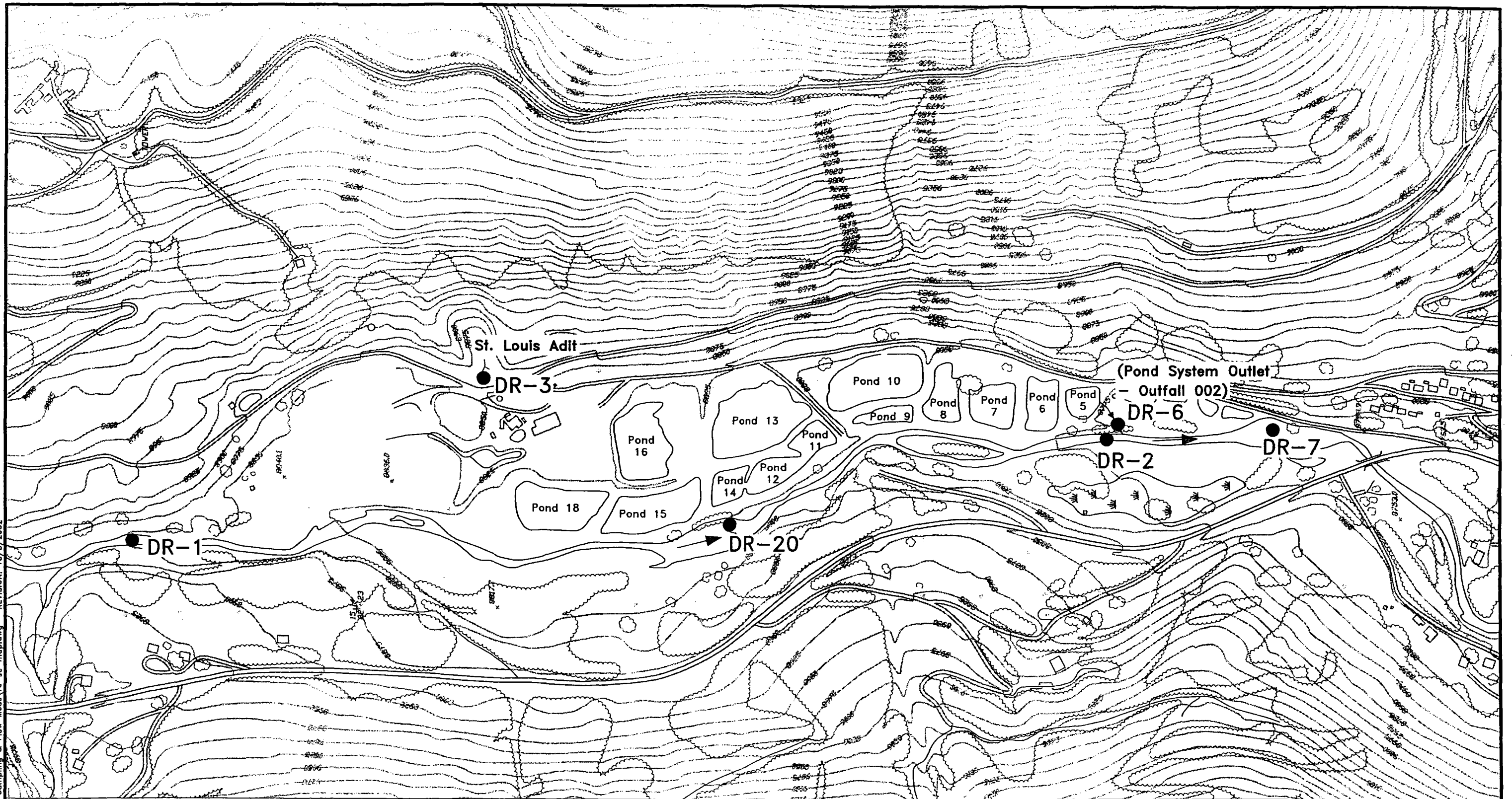
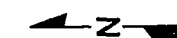
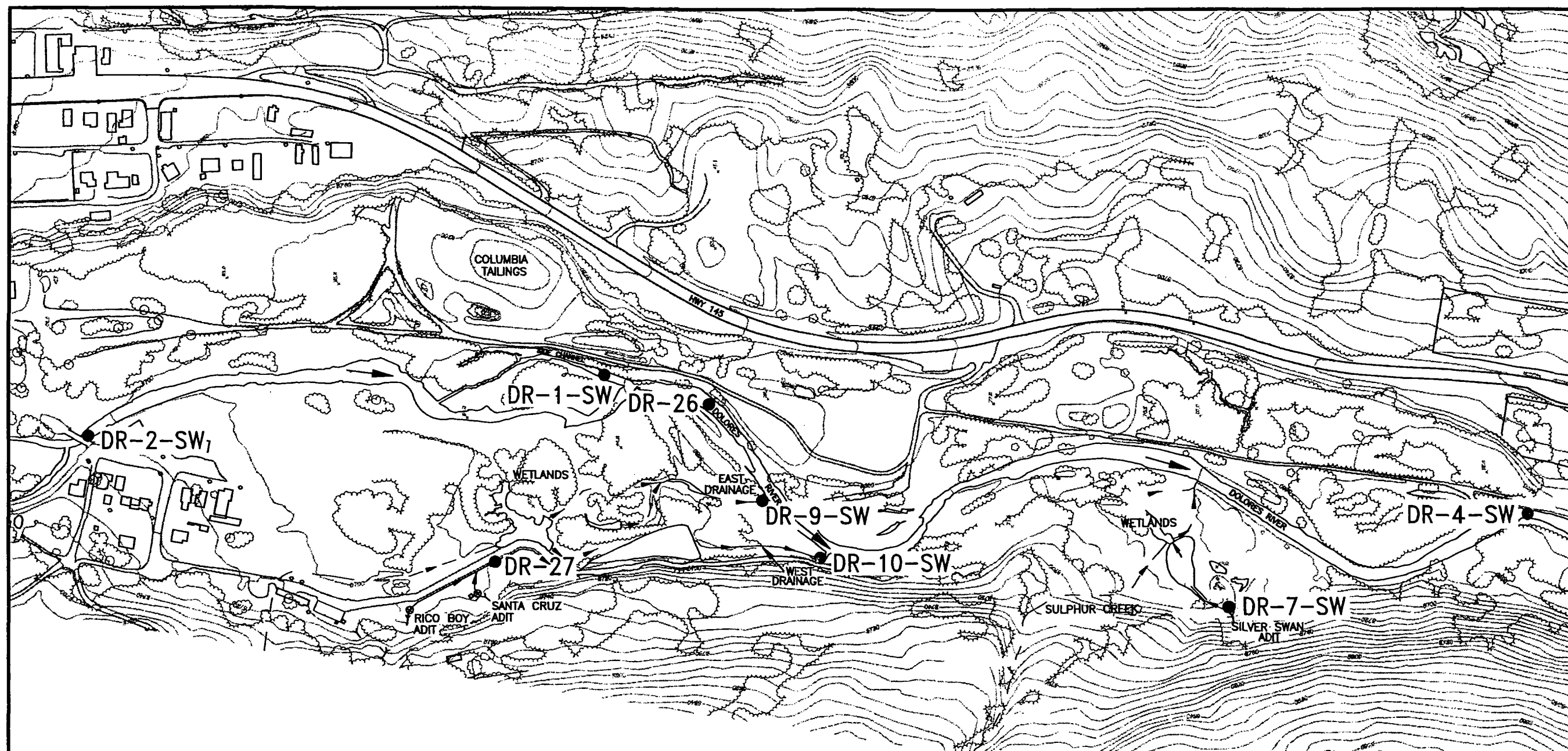


Figure 3
St. Louis Settling Pond System



0 300 Feet

Figure 4
Dolores River Corridor
Sampling Station Location Map

PHOTOS

- Photo 1 Blaine Adit
- Photo 2 Silver Creek just above the Argentine tailings seep (SVS-22)
- Photo 3 Argentine Tailings seep- east fork of seep looking east
- Photo 4 Argentine Tailings seep - north face
- Photo 5 Unnamed adit downstream from the overhead tramway along Silver Creek
- Photo 6 Unnamed adit discharge to Silver Creek downstream from the overhead tramway along Silver Creek
- Photo 7 Silver Creek just above the confluence with the Dolores River (SVS-20).
- Photo 8 Silver Creek just above the confluence with the Dolores River (SVS-20).
- Photo 9 St. Louis adit
- Photo 10 Rico Boy adit
- Photo 11 Santa Cruz adit
- Photo 12 DR-27: Rico Boy/Santa Cruz combined flow
- Photo 13 DR-9-SW Rico Boy/Santa Cruz wetland outlet
- Photo 14 DR-1-SW Dolores R. side channel/Columbia Tailings Seep
- Photo 15 Columbia Tailings seep side channel
- Photo 16 Silver Swan

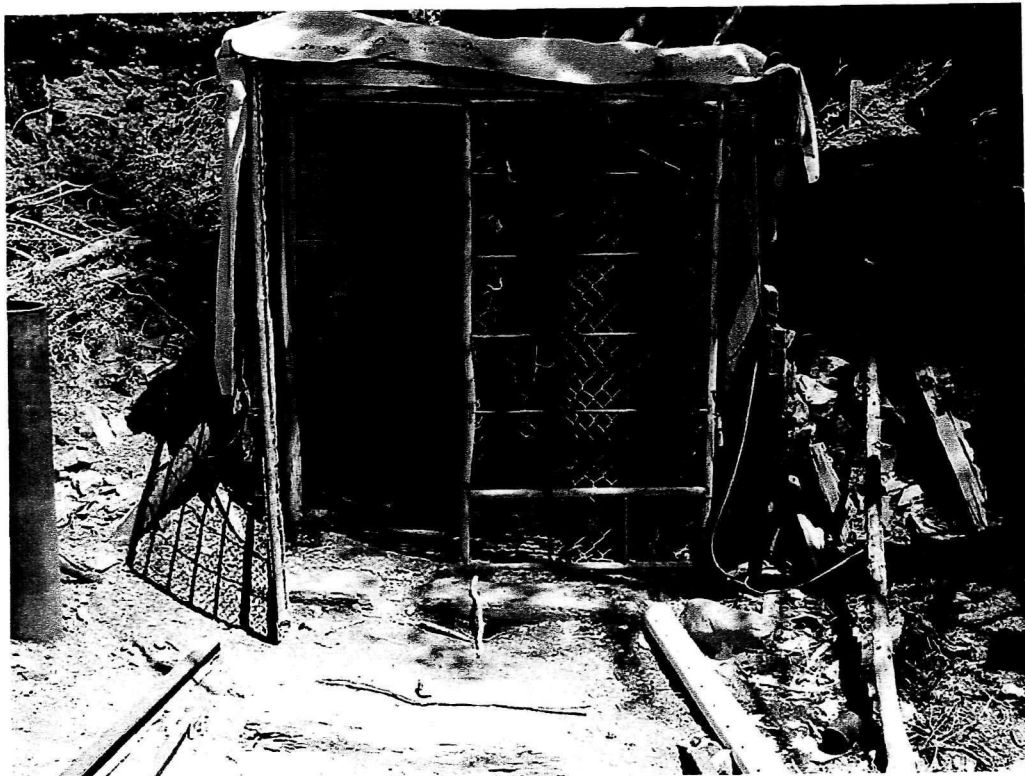


Photo 1 Blaine Adit - no discharge or seepage.



Photo 2 Silver Creek just above the Argentine tailings seep (SVS-22) showing the constructed pools.



Photo 3 Argentine Tailings seep- east fork of seep, looking east.



Photo 4 Argentine Tailings seep - north face, looking north.



Photo 5 Unnamed adit downstream from the overhead tramway along Silver Creek. View of the adit.



Photo 6 Unnamed adit discharge to Silver Creek downstream from the overhead tramway along Silver Creek (SVS-26). Flow was measured to be 2.1 gpm.



Photo 7 Silver Creek just above the confluence with the Dolores River (SVS-20).



Photo 8 Silver Creek just above the confluence with the Dolores River (SVS-20).



Photo 9 St. Louis tunnel flow exiting portal and entering culvert under the road.



Photo 10 Rico Boy adit

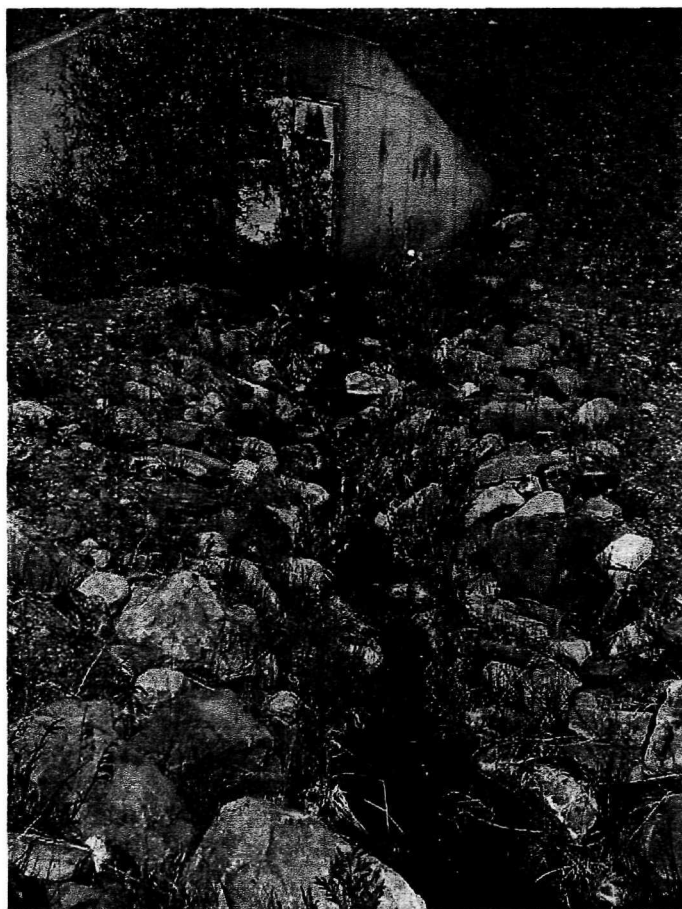


Photo 11 Santa Cruz adit and discharge ditch.



Photo 12 DR-27: Rico Boy/Santa Cruz combined flow. Sampling location next to pail looking upstream, Santa Cruz adit on left



Photo 13 DR-9-SW Rico Boy/Santa Cruz wetland outlet, east and west channels.

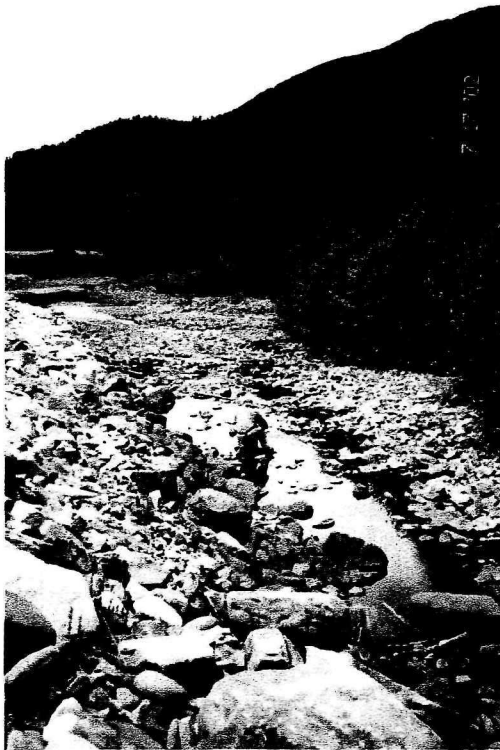


Photo 14 DR-1-SW Dolores R. side channel/Columbia Tailings Seep
Water quality sampling site looking downstream (south).



Photo 15 Columbia Tailings seep side channel, looking upstream.



Photo 16 Silver Swan. Adit flow entering from ditch on left, low water levels in ponds shown.

APPENDIX A

Field Records

APPENDIX A1

Field Notes

7-13-02

4:30 pm

- C) MIXER ON LIME SLURRY DRUM
- D) PH METER / SLURRY PUMP CONTROLLER
- E) ~~AD~~ SLURRY PUMP SPEED CONTROLLER
- F) PERISTALTIC PUMP / SLURRY PUMP

ADDED ~10" WATER TO DRUM → 10% - 11% SLURRY
OCCASIONAL PH READINGS TAKEN AT
WEIR WITH W.Q. PH METER.

7:30 AM - EQUIPMENT LEFT RUNNING.
ALAN AND I GO TO DINING. PATCHED
LEAK IN RECIRCULATION PUMP OUTLET
HOSE.

8:45 pm ON SITE. DIVERTED AIT INFLOW
FROM INLET TANK TO GROUND. TURNED
OFF RECIRCULATION PUMP AND SHUT
DOWN MIXER + LIME FEED. REMOVE
DIVERSION PLATE. RAIN PROOF
EQUIPMENT

9:15 PM - LEAVE SITE

SM

7-14-02

STEVEN MORGENSTEIN

ALAN JEWELL

SUNNY ~ 65°F

8:15 AM ARRIVE AT ST. LOUIS. ALAN
ESTIMATES ABOUT ONE 5-GAL PAIL OF
SLUDGE IN BAG. ADDED ABOUT 3 GAL.
WATER TO SLURRY DRUM. SET UP ALL
EQUIPMENT. EVIDENCE OF SOME SOLIDS
ESCAPING BAG, BUT DOES NOT APPEAR
TO BE SIGNIFICANT. MOST SEEMS TO BE
COMING OUT OF THE SEAMS.

8:40 AM SYSTEM STARTED. FLOWRATE
INCREASED TO 60 GPM. PUMP
INTAKE CHANGED TO INCREASE
RECIRCULATION FLOW. SOME
SOLIDS SETTLED OUT IN TANK
OVERNIGHT

9:50 - BREAKFAST

10:15 GAS CAN FILLUP AND CALL BILL.

11:00 ON SITE

SM

7-14-02

4:40pm ST LOUIS. NO WATER OUT OF
BAG RELIEF, A FEW HOLES IN BLUE
HONDA PUMP DISCHARGE HOSE, LINE
FEED HOSE WAS ABOVE/OUT OF SLURRY.
WE DUCT-TAPED MOST HOSE HOLES.
ADDED 10 PAUL INCHES OF LINE AND
10 DRUM INCHES OF WATER. ALSO
ATTACHED A ROCK TO LINE INTAKE HOSE.

5:30pm DR-28 FILTER BAG EFFLUENT.
OVERCAST.

CONDUCTIVITY 933 at 20°C -

SPECIFIC CONDUCTANCE (at 25°C) 1036

TEMP 20°C

pH 9.39

Alkalinity - clear - 102; DIFFICULT
READ; TENDED TO AQUA OVER TIME

TDS, TSS, HARDNESS, DISSOLVED METALS,
TRec,

5:30 TURNED
OFF HONDA
PUMP (SM)

SM

7-14-02

6:40pm OVERCAST DR-26, DOLORES
RIVER BETWEEN COLUMBIA SEEP AND
SANTA LAUZ WETLANDS

CONDUCTIVITY 355.8 at 16.4°C

SPECIFIC CONDUCTANCE 425 at 25°C

TEMP 16.4°C

pH 7.59

ALKALINITY - clear - 93

STA	DEPTH	V1	V2	V3	
44.0	0	0	0	0	EDGE WATER
45.0	0.75	0.12	0.07	0.11	
9.5	0.2	0.07	0.07	0.06	
11.0	0	0	0	0	
13.2	0.26	0.49	0.49	0.47	
16.5	0.40	0.59	0.58	0.60	
20.0	0.63	0.25	0.26	0.22	
23.0	0.62	0.30	0.33	0.33	
26.5	0.63	0.48	0.56	0.50	
30.0	0.48	0.06	0.00	0.02	
33.5	0.52	0.14	0.25	0.14	
37.0	0.75	0.98	1.02	1.09	
40.5	0.69	1.13	1.13	1.10	
44.0	0.49	0.69	0.83	0.71	
47.0	0.25	0.38	0.42	0.42	
49.0	EDGE WATER				SM

7-15-02

10:00AM - BREAK FOR BREAKFAST/
FILL OUT WQ SAMPLE LABELS

10:55AM - RICO/ST. LOUIS FOR
EQUIPMENT BREAKDOWN

1:00 PM - CRUDE SETTLING TEST
LIMED SOLIDS SETTLED CLEAR
FROM BEAKER STARTING AT
11:30AM * SETTLING TIME
LESS THAN 1.5 HOURS

1:40 DR-2-SW, OVERCAST, ~70°F

CONDUCTIVITY 359.7 μ S 17.4°C
SPECIFIC CONDUCTANCE 422.0 @ 25°C
PH 7.24 @ 23.8°C
TEMP 17.4°C
ALKALINITY - clear - 82

SOME THUNDER.

SM

7-15-02

DR-2-SW FLOW

STA	DEPTH	V1	V2	V3	
6.0	0	0	0	0	EDGE WATER
6.7	0.21	-0.04	-0.05	-0.06	
9.0	0.25	-0.09	-0.03	-0.00	
11.0	0.85	1.11	1.05	1.09	
13.0	1.18	1.73	1.81	1.75	
14.0	1.25	2.42	2.19	2.39	
15.0	0.30	1.72	1.98	1.88	
15.4	1.03	1.10	1.09	1.24	
18.4	1.08	0.96	0.70	0.75	
20.0	0.91	0.97	1.06	1.04	
22.0	0.82	0.73	0.74	0.80	
24.0	0.56	0.23	0.28	0.27	
26.0	0.24	0.11	0.14	0.16	
28.4	0	0	0	0	EDGE WATER

SM

8:40 Mercury Sample

@ 9:00 am

Calibrate pH 7 → 7.01

pH 10 → 9.67

pH 7.17 @ 15.7 °C

Redox 66.1 mV

9:40-11:40 scheduling

DR-7

DR-7 arrive @ site 11:55 am

Dolores River below st. house settling pond system

conductivity 345.1 ^{µS} @ 14.7 °C

Specific Conductivity (calculated) 432.6 ^{µS} @ 25 °C

pH 9.38 @ 15.6 °C

Redox 98.0 mV

Alkalinity - clear - 120

* Mercury collected @ 12:10 pm

some Thunder

White Dot

No Dot

Purple Dot

Green Dot

Samples collected

DR-7 Stream Flow @ Thunder and light Rain

STA	Depth (ft)	V ₁	V ₂	V ₃
5.8	edge of water			
7.0	0.35	0.1	0.1	0.09
10.0	0.52	0.32	0.45	0.46
13.7				
13.7	0.45	0.75	0.81	0.81
16.0	0.60	0.46	0.43	0.37
19.0	0.60	1.30	1.24	1.42
21.0	0.40	0.86	0.99	0.86
23.8	0.30	0.44	0.44	0.42
27.1	0.67	0.21	0.25	0.23
29.9	0.60	0.52	0.63	0.52
33.0	1.32	0.62	0.74	0.72
35.7	1.41	1.75	1.23	1.74
			1.35	
38.4	edge of water			

Photograph #7: DR-7 Stream Flow measurement site

#8: DR-7 Water Quality sample site

7/17/2002 - sunny
65°F

DR-10-SW

Rica Bay/Santa Cruz

settling Pond Discharge

arrive 7:55 am

Photograph #18

close up of DRY DR-10-SW

Photograph #20 19

View upstream of settling
Pond Discharge

Photograph #21 20

View of DR-10-SW from
across Dolores

White stick = 2 Feet in length

Did NOT SAMPLE DR-10-SW because
DRY

The settling pond was approximately
3 Feet below crest - Draining by
seepage. The pond also contained
an oil skin layer on top

N

DR-9-SW 8:35 am

#22 - Picture of east channel and
stagnant Pond from Dolores River

#23 - Picture of east channel from
edge of ~~the~~ stagnant Pond

#23 - " " water quality
with Steven standing @ sampling
site

#24 - West Channel & Pond

25% Flow from West Channel

75% " " East Channel

Combined Sample = Composite of
25% West Channel
75% East Channel

Conductivity

Specific Conductivity (blinking)

pH 8.77 20.4 °C

Alkalinity Clear 326

sampled @ 8:58 am

East Channel

Conductivity 551 μ S 14.6 °C

Specific Conductivity (blinking) 710 μ S 25°C

West Channel - NOTE: Had problems submerging
probe - could not get good reading

Conductivity 513 μ S 12.1 °C

Specific Conductivity (blinking) 680 μ S 25°C

2002-07-17 08:58:00

Steven thinks the measurement represents 70% of the flow
 Ana thinks the flow measurement represents 75-80% of the flow

Photograph #5 - Water Quality Sampling site
 Wetland sample collected
 white Dot Purple Dot
 No Dot Red Dot
 Green Dot Mercury Sample
 collected @ 10:45 am

Conductivity 1169 19.9°C
 Specific Conductivity (Blinking) 1308 25°C
 pH 7.96 24.7°C
 Alkalinity Clear 657
 Redox 272 mV

DR-1-SW 11:35 am - Partly Cloudy & Sunny, hot 85°F

Dolores River side channel

Columbia Tailings seep

Photo #8 - Photo looking South
 Downstream

Photo #9 - Photo looking upstream

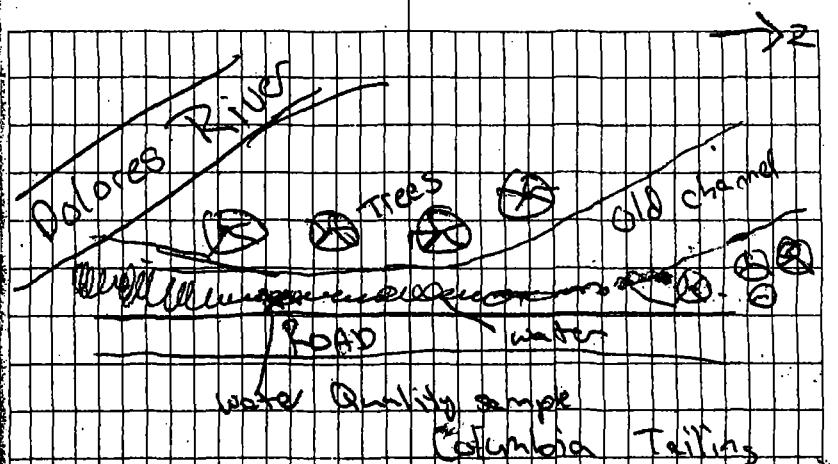


Photo 11 - Sampling Site looking upstream
 " 12 - " looking Downstream

White Dot Green Dot Red Dot
 No Dot Purple Dot Wetland Sample

Sample collected @
 Bulk 6 gallon jugs

383.2 μS
 Conductivity ~~383.2~~ 16.9°C
 Specific Conductivity (Blinking) 443.6 25°C
 pH 8.88 @ 19.6°C
 Alkalinity - clear - 128
 Redox 88.5 μS

3:05 ANA TO TELURIE

3:20 SM TO ARGENTINE. LOOKING FOR

MYSTERY SEEP ON SOUTH SIDE OF SILVER

CREEK. WAK SAID THE SEEP IS REPORTED

TO BE $\frac{1}{2}$ TO $\frac{1}{4}$ MILE BELOW BLAINE. THE

ARGENTINE SEEP IS $\frac{1}{4}$ MILE BELOW BLAINE.

I DROVE UP TO THE BUILDINGS NEAR THE BLAINE

ADIT AND THEN DROVE 0.5-0.6 MILES

DOWN THE ROAD THAT RUNS ALONG SILVER

CREEK (THE ROAD UP TO ARGENTINE TAILINGS).

I PARKED THE TRUCK AND WALKED THE

ROAD UP TO THE BLAINE ADIT AND THEN

WALKED DOWN THE CREEK TO THE TRUCK,

~0.5 to 0.6 MILES. NO EVIDENCE OF

A SEEP ON THE SOUTH SIDE OF THE CREEK.

PR-2 Dolores River just above

002 Discharge

Arrive @ 5:30 pm - cloudy 75°F

Chance of rain

Stream flow measurement @ 6:20 pm

7/17/2007

STATION	(feet) DEPTH	feet/sec		
		V ₁	V ₂	V ₃
9.5	Edge of water			
11.1	0.32	0.07	0.05	0.08
14.5	0.53	0.50	0.49	0.56
18.3	0.58	0.32	0.36	0.28
21.55	0.52	1.00	0.92	0.94
24.8	0.99	0.91	0.92	0.94
28.3	0.75	0.91	0.97	0.95
31.0	0.92	0.83	0.85	0.74
			4th # → 0.91	
33.8	1.09	0.72	0.73	0.70
37.2	0.81	0.52	0.40	0.48
39.2	0.90	0.28	0.27	0.23
40.9	0.77	0.60	0.62	0.60
41.9	0			
42.8	0.33	0.31	0.30	0.31
42.9	Edge of water			

Note: seems to be a good flow measurement location

7/18/02

09:25 SVS-8 - SILVER CREEK BELOW ARGENTINE TAILINGS

SAMPLES COLLECTED 09:35

GREEN DOT, RED, PURPLE, WHITE, NO DOT

CONDUCTIVITY 326.8 at 9.2°C

SPECIFIC CONDUCTANCE 472 at 25°C

TEMP 9.2°C

pH 9.0 @ 11.1°C

ALKALINITY clear

~~SVS-8~~ DR-7-SW arrive @ 9:20 am

sample for Fe using white Dot bottle @ 9:25 am

Picture of Tailings

2 pictures of seep

2 pictures of drainage & wetlands

SVS-8 - silver Creek below Argentine

Tailings - Stream Piles measured

@ 10:05

Station	Depth (feet)	V ₁	Ft, sec
3.1	Edge of water		
3.6	0.34	0.04	
4.0	0.45	0.05	
4.4	0.38	0.18	
4.8	0.30	0.03	
5.2	0.56	0.05	
5.65	0.59	0.05	
6.25	0.57	0.05	
6.80	0.41	0.05	
7.20	0.22	0.05	
7.70	0.28	0.05	0.05
9.10	Edge of water		

SVS-12

- Argentine Tailings Seep

arrive @ 10:30 am

Conductivity

733 μ S

7.4°C

Specific Conductivity

995 μ

25°C

Temp

7.4°C

pH

8.79

12.5°C

Redox

53.1 mV 13.4°C

7-18-02 cont.

Water Quality sampled collected
@ 12:50 pm

White Dot	Green Dot	Purple Dot
No Dot	Red Dot	

Conductivity 191.3 μ S 9.2°C
Specific Conductivity (linking) 274.2 μ S 25°C
pH 9.66 11.3°C
alkalinity - clear - 90

Roll #3 picture
#1 - SWS-22 sampling site from
#2 - " " " " NORTH SIDE

SAMPLE COLLECTION NOTES: FOR
ARGENTINE SEEP, RICOBOY/SANTA CRUZ
COMBINED FLOW, AND COLUMBIA TAILINGS
SEEP THE 6-GALLON JUG WAS RINSED WITH
SAMPLE WATER THREE TIMES, THEN THE
JUG FILLED. WATER WAS POURED FROM THE
JUG INTO THE SAMPLE BOTTLES FOR THE LAB, AND
INTO TRANSFER CONTAINERS (RINSED 3 TIMES) FOR
FIELD WATER CHEMISTRY. SILVER SWAN LAB SAMPLES
CAME FROM ADIT FLOW DIRECTLY, NOT THE JUG.

7-18-02

DR-7 @ 2:10 pm
collected Mercury Sample

DR-3 @ 2:20 pm
collected Mercury Sample

2:45 pm ANA TO TELVADE TO UPS.
8:00 HIKE SILVER CREEK IN
SEARCH OF MYSTERY SEEP. YESTERDAY
I WALKED FROM THE BLAINE ADIT
DOWN THE CREEK TO JUST DOWNSTREAM
OF THE ARIAL TRAMWAY CABLES.
TODAY I STARTED AT THE TRAMWAY
CABLES AND PROCEEDED DOWNSTREAM.
AFTER APPROXIMATELY 10 MINUTES
I FOUND THE SEEP. THE SEEP IS ON
THE SOUTH SIDE OF THE CREEK AND
THE SOURCE IS AN OLD ADIT ~50-75'
FROM THE CREEK. THE ADIT HAS A
SMALL REBAR GATE ON IT AND IS IN
SOLID ROCK. ESTIMATED FLOW OF
2-5 gpm. FROM THE SEEP, I HIKE ON
BEARING 330° (30° W OF N) TO THE ROAD.
~0.13 MILES FROM THE TRAMWAY →

LSM

DR-1 Flow Measurement
@ 8:45 am

Ft/sec

CONT.

Depth (A)	V ₁	V ₂	V ₃	STATION
edge of water				49.6 edge of water
0.32	0.06	0.10	0.08	
0.20	0.10	-0.05	-0.03	DR-1 + Dolans River above
0.0				St. Louis Ponds
0.75	0.66	0.69	0.64	
0.90	1.71	1.74	1.64	stream flow measurement take 3
0				downstream from fence
0				
0.86	1.21	1.21	1.26	Water Quality collected @
0.68 0.78	1.85	1.82	1.74	White Dot Green Dot
0.15				No Dot Red Dot
0.15				
0.93	1.22	1.19	1.10	conductivity 185.8 μ S
0.33	0.90	0.78	0.95	specific conductance 250.2
0.72	0.80	0.83	0.75	pH 9.51
0.51	0.15	0.14	0.18	alkalinity clear
0.55	0.96	1.07	1.02	
1.01	0.65	0.64	-0.56	4 pictures of stream flow measure
0.78 0.78	-0.01	-0.05	-0.02	ments
0.2	-0.16	-0.18	-0.10	4 pictures And doing pH
0				measurements
0.56	0.09	0.07	0.07	1 St. Louis Adit
0.60	0.39	0.38	0.38	4 pictures of St. Louis adit
0.47	0.59	0.58	0.63	flume
0.36	0.61	0.58	0.57	

APPENDIX A2

Field Sampling and Stream Flow Measurement Forms

Rico AARCOE0105.00
 DR - 1 Dolores River above St. Louis settling pond system
 Flow Measurements on 7/19/2002 @ 9:45 am
 Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	12.5	1.1	0	0.16	edge of water			0.00	0.04	0.007
2	13.6	1.2	0.32	0.26	0.06	0.1	0.08	0.08	0.04	0.014
3	14.8	0.6	0.2	0.1	0.1	-0.05	-0.03	0.01	0.00	0.000
4	15.4	3.15	0	0.375	0	0	0	0.00	0.34	0.396
5	18.55	3.44	0.75	0.825	0.66	0.69	0.66	0.67	1.18	3.358
6	21.99	0.01	0.9	0.45	1.71	1.74	1.64	1.70	0.85	0.004
7	22	3.3	0	0	0	0	0	0.00	0.00	0.000
8	25.3	0.3	0	0.43	0	0	0	0.00	0.63	0.081
9	25.6	0.6	0.86	0.82	1.31	1.21	1.26	1.26	1.53	0.754
10	26.2	0.25	0.78	0.465	1.85	1.82	1.74	1.80	0.90	0.105
11	26.45	0.8	0.15	0.15	0	0	0	0.00	0.00	0.000
12	27.25	0.15	0.15	0.54	0	0	0	0.00	0.59	0.047
13	27.4	2.2	0.93	0.63	1.22	1.19	1.1	1.17	1.02	1.418
14	29.6	0.3	0.33	0.525	0.9	0.78	0.95	0.88	0.84	0.132
15	29.9	3.1	0.72	0.615	0.8	0.83	0.75	0.79	0.48	0.906
16	33	3.2	0.51	0.53	0.15	0.14	0.18	0.16	0.59	0.995
17	36.2	1.3	0.55	0.78	0.96	1.07	1.02	1.02	0.82	0.828
18	37.5	0.95	1.01	0.865	0.65	0.64	0.56	0.62	0.30	0.242
19	38.45	0.95	0.72	0.46	-0.01	-0.05	-0.02	-0.03	-0.09	-0.038
20	39.4	1.1	0.2	0.1	-0.16	-0.18	-0.1	-0.15	-0.07	-0.008
21	40.5	0.4	0	0.28	0	0	0	0.00	0.04	0.004
22	40.9	1.45	0.56	0.58	0.09	0.07	0.07	0.08	0.23	0.193
23	42.35	1.45	0.6	0.535	0.39	0.38	0.38	0.38	0.49	0.381
24	43.8	3.2	0.47	0.415	0.59	0.58	0.63	0.60	0.59	0.788
25	47	2.6	0.36	0.18	0.61	0.58	0.57	0.59	0.29	0.137
26	49.6		0	0	edge of water					

Total Flow (cfs): 10.745
 Total Flow (gpm): 4822.36

Note: USGS 09165000 at Dolores River below Rico, CO
 @ 9:45 on 07/19/02 = 8.7 cfs

Rico AARCOE0105.00
 DR - 2 Dolores River immediately above St. Louis settling pond system outfall
 Flow Measurements on 7/17/2002 @ 6:20pm
 Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	velocity measurement #4 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	9.5	1.6	0	0.16	edge of water					0.03	0.009
2	11.1	3.4	0.32	0.425	0.07	0.05	0.08		0.07	0.29	0.421
3	14.5	3.8	0.53	0.555	0.5	0.49	0.56		0.52	0.42	0.882
4	18.3	3.25	0.58	0.55	0.32	0.36	0.28		0.32	0.64	1.138
5	21.55	3.25	0.52	0.655	1	0.92	0.94		0.95	0.94	1.997
6	24.8	3.5	0.79	0.77	0.91	0.92	0.94		0.92	0.93	2.515
7	28.3	2.7	0.75	0.835	0.91	0.97	0.95		0.94	0.89	2.002
8	31	2.8	0.92	1.005	0.83	0.85	0.74	0.91	0.83	0.77	2.180
9	33.8	3.4	1.09	0.95	0.72	0.73	0.7		0.72	0.59	1.911
10	37.2	2	0.81	0.855	0.52	0.4	0.48		0.47	0.36	0.621
11	39.2	1.7	0.9	0.835	0.28	0.27	0.23		0.26	0.43	0.615
12	40.9	1	0.77	0.385	0.6	0.62	0.6		0.61	0.30	0.117
13	41.9	0.9	0	0.165	0	0	0		0.00	0.15	0.023
14	42.8	0.1	0.33	0.165	0.31	0.3	0.31		0.31	0.15	0.003
21	42.9		0	0	edge of water						

Total Flow (cfs): 14.434
 Total Flow (gpm): 6478.059

Note: USGS 09165000 at Dolores River below Rico, CO
 @ 18:15 on 07/17/02 = 6.5 cfs

Rico AARCOE0105.00
DR - 3 St. Louis Adit at flume
Flow Measurements on 7/16/2002 @3.00 pm
Personnel: Steven Morgenstern

9-inch Parshall Flume
used table

0.46' = 0.9357 cfs
 420 gpm

Rico AARCOE0105.00
DR - 6 Dolores River @ 002 Outfall
Flow Measurements on 7/16/2002 @ 1:30 pm
Personnel: Steven Morgenstern, Ana Vargo

9-inch Parshall Flume
used table

0.17 =	0.204 cfs
	91.58 gpm

Rico AARCOE0105.00
 DR - 7 Dolores River below St. Louis Ponds Outfall
 Flow Measurements on 7/16/2002 @ 12:30 pm
 Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	velocity measurement #4 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	5.8	1.2	0	0.175	edge of water				0	0.05	0.010
2	7	3	0.35	0.435	0.1	0.1	0.09		0.10	0.27	0.352
3	10	3.7	0.52	0.485	0.42	0.45	0.46		0.44	0.62	1.107
4	13.7	2.3	0.45	0.525	0.75	0.81	0.81		0.79	0.61	0.731
5	16	3	0.6	0.6	0.46	0.43	0.37		0.42	0.87	1.566
6	19	2	0.6	0.5	1.3	1.24	1.42		1.32	1.11	1.112
7	21	2.8	0.4	0.35	0.86	0.99	0.86		0.90	0.67	0.655
8	23.8	3.3	0.3	0.485	0.44	0.44	0.42		0.43	0.33	0.531
9	27.1	2.8	0.67	0.635	0.21	0.25	0.23		0.23	0.39	0.699
10	29.9	3.1	0.6	0.96	0.52	0.63	0.52		0.56	0.63	1.860
11	33	2.7	1.32	1.365	0.62	0.74	0.72		0.69	1.11	4.074
12	35.7	2.7	1.41	0.705	1.75	1.23	1.74	1.35	1.52	0.76	1.444
13	38.4		0	0	edge of water						

Total Flow (cfs): 14.141
 Total Flow (gpm): 6346.37

Note: USGS 09165000 at Dolores River below Rico, CO
 @ 12:30 on 07/16/02 = 7 cfs

Rico AARCOE0105.00
 DR - 26 Dolores River between Columbia Seep and Santa Cruz wetlands
 Flow Measurements on 7/14/2002 @ 6:40 pm
 Personnel: Alan Jewell, Steven Morgenstern

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	4	3.5	0	0.375	edge of water			0.00	0.05	0.066
2	7.5	2	0.75	0.475	0.12	0.07	0.11	0.10	0.08	0.079
3	9.5	1.5	0.2	0.1	0.07	0.07	0.06	0.07	0.03	0.005
4	11	2.2	0	0.13	0	0	0	0.00	0.24	0.069
5	13.2	3.3	0.26	0.33	0.49	0.49	0.47	0.48	0.54	0.584
6	16.5	3.5	0.4	0.515	0.59	0.58	0.6	0.59	0.42	0.751
7	20	3	0.63	0.625	0.25	0.26	0.22	0.24	0.28	0.528
8	23	3.5	0.62	0.625	0.3	0.33	0.33	0.32	0.42	0.911
9	26.5	3.5	0.63	0.555	0.48	0.56	0.5	0.51	0.27	0.524
10	30	3.5	0.48	0.5	0.06	0	0.02	0.03	0.10	0.178
11	33.5	3.5	0.52	0.635	0.14	0.25	0.14	0.18	0.60	1.341
12	37	3.5	0.75	0.72	0.98	1.02	1.09	1.03	1.08	2.709
13	40.5	3.5	0.69	0.59	1.13	1.13	1.1	1.12	0.93	1.924
14	44	3	0.49	0.37	0.69	0.83	0.71	0.74	0.58	0.638
15	47	2	0.25	0.125	0.38	0.42	0.42	0.41	0.20	0.051
16	49		0	0	edge of water					

Total Flow (cfs): 10.359
 Total Flow (gpm): 4649.23

Note: USGS 09165000 at Dolores River below Rico, CO
 @ 18:45 on 07/14/02 = 6.5 cfs

Rico AARCOE0105.00
 DR - 27 Rico Boy/Santa Cruz combined flow
 Flow Measurements on 7/17/2002 from 10:10am
 Personnel: Steven Morgenstern, Ana Vargo

	Water depth from bottom of bucket	Volume (cubic ft) (use attached table)	Time (seconds)	Flow (cfs)	Flow (gpm)
Test 1	0.72	0.902	16.82	0.053627	24.068
Test 2	0.72	0.902	16.53	0.054567	24.490
Test 3	0.74	0.903	17.25	0.052348	23.494
Test 4	0.74	0.903	17.03	0.053024	23.797
AVG assuming 75% of flow				0.053	23.962
100% Flow assuming 75% of flow captured				0.07	31.95

Note: Steven Morgenstern thinks this represents 70% of the actual flow
 Note: Ana Vargo thinks this represents 75-80% of the actual flow

Note: Used standard 5 gallon bucket (orange)

	seconds
Test 1	16.82
Test 2	16.53
Test 3	17.25
Test 4	17.03

Enter known data pairs:		
	height	inside
	(ft)	diameter
	(ft)	(ft)
Data 1	0	0.85
Data 2	1.18	0.935

Query x (sta)	Result y (elev)	
water depth (ft)	w.s. diameter (ft)	volume (cubic ft)
0	0.850	0.000
0.05	0.854	0.024
0.1	0.857	0.049
0.15	0.861	0.074
0.2	0.864	0.099
0.25	0.868	0.125
0.3	0.872	0.151
0.35	0.875	0.177
0.4	0.879	0.203
0.45	0.882	0.229
0.5	0.886	0.256
0.55	0.890	0.283
0.565	0.891	0.291
0.595	0.893	0.307
0.6	0.893	0.310
0.65	0.897	0.338
0.7	0.900	0.365
0.725	0.902	0.379
0.75	0.904	0.393
0.8	0.908	0.422
0.85	0.911	0.450
0.9	0.915	0.479
0.95	0.918	0.508
1	0.922	0.537
1.05	0.926	0.567

Rico AARCOE0105.00
 DR-1-SW Dolores River side channel/Columbia Tailings Seep
 Upstream Site - dolores River flow entering the side channel
 Flow Measurements on 7/17/2002 @ 12:50 pm
 Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	2.25	0.4	0	0.145	edge of water			0.00	-0.03	-0.001
2	2.65	0.45	0.29	0.345	-0.05	-0.05	-0.05	-0.05	-0.03	-0.004
3	3.1	0.4	0.4	0.4	0	-0.01	-0.01	-0.01	-0.01	-0.002
4	3.5	0.4	0.4	0.375	-0.03	-0.01	-0.02	-0.02	-0.03	-0.004
5	3.9	0.4	0.35	0.365	-0.05	-0.02	-0.03	-0.03	-0.02	-0.003
6	4.3	0.4	0.38	0.375	-0.02	-0.01	0.01	-0.01	0.06	0.009
7	4.7	0.4	0.37	0.35	0.11	0.12	0.14	0.12	0.12	0.017
8	5.1	0.4	0.33	0.405	0.11	0.11	0.13	0.12	0.09	0.015
9	5.5	0.4	0.48	0.425	0.06	0.08	0.06	0.07	0.04	0.007
10	5.9	0.1	0.37	0.185	0.03	0.02	0.01	0.02	0.01	0.000
13	6		0	0	edge of water					

Total Flow (cfs): 0.033
 Total Flow (gpm): 14.83

Note: Channel is really shallow; therefore, the measurement will be questionable

Rico AARCOE0105.00
 DR-1-SW Dolores River side channel/Columbia Tailings Seep
 Downstream Site - flow exiting side channel
 Flow Measurements on 7/17/2002 @ 12:40 pm
 Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	8.4	0.3	0	0.125	edge of water			0.00	0.01	0.000
2	8.7	0.7	0.25	0.225	0	0.02	0.03	0.02	0.03	0.005
3	9.4	0.7	0.2	0.2	0.04	0.05	0.04	0.04	-0.01	-0.002
4	10.1	0.7	0.2	0.125	-0.07	-0.06	-0.07	-0.07	-0.03	-0.003
5	10.8	0.7	0.05	0.175	0	0	0	0.00	-0.03	-0.003
6	11.5	0.6	0.3	0.285	-0.05	-0.05	-0.05	-0.05	0.09	0.015
7	12.1	1	0.27	0.31	0.24	0.23	0.22	0.23	0.15	0.046
8	13.1	0.6	0.35	0.315	0.08	0.07	0.05	0.07	0.01	0.003
9	13.7	0.8	0.28	0.24	-0.05	-0.04	-0.03	-0.04	-0.04	-0.008
10	14.5	1.3	0.2	0.1	-0.04	-0.05	-0.04	-0.04	-0.02	-0.003
11	15.8	1.7	0	0.1	0	0	0	0.00	-0.02	-0.003
12	17.5	0.3	0.2	0.1	-0.03	-0.03	-0.03	-0.03	-0.02	0.000
13	17.8		0	0	edge of water					

Total Flow (cfs): 0.048
 Total Flow (gpm): 21.32

Note: Channel is really shallow; therefore, the measurement will be questionable

Rico AARCOE0105.00
 DR-2-SW Dolores River above Columbia Tailings
 Flow Measurements on 7/15/2002 @ 1:40 pm
 Personnel: Alan Jewell, Steven Morgenstern

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	6	0.7	0	0.105	edge of water			0.00	-0.03	-0.002
2	6.7	2.3	0.21	0.23	-0.04	-0.05	-0.06	-0.05	-0.05	-0.024
3	9	2	0.25	0.55	-0.09	-0.03	0	-0.04	0.52	0.574
4	11	2	0.85	1.015	1.11	1.05	1.09	1.08	1.42	2.889
5	13	1	1.18	1.215	1.73	1.81	1.75	1.76	2.05	2.489
6	14	1	1.25	0.775	2.42	2.19	2.39	2.33	2.10	1.625
7	15	0.4	0.3	0.665	1.72	1.98	1.88	1.86	1.50	0.399
8	15.4	3	1.03	1.055	1.1	1.09	1.24	1.14	0.97	3.081
9	18.4	1.6	1.08	0.995	0.96	0.7	0.75	0.80	0.91	1.454
10	20	2	0.91	0.865	0.97	1.06	1.04	1.02	0.89	1.540
11	22	2	0.82	0.69	0.73	0.74	0.8	0.76	0.51	0.702
12	24	2	0.56	0.4	0.23	0.28	0.27	0.26	0.20	0.159
13	26	2.4	0.24	0.12	0.11	0.14	0.16	0.14	0.07	0.020
14	28.4		0	0	edge of water					

Total Flow (cfs): 14.905
 Total Flow (gpm): 6689.28

Note: USGS 09165000 at Dolores River below Rico, CO
 @ 13:45 on 07/15/02 = 7 cfs

Rico AARCOE0105.00
 DR - 4 - SW Dolores River below Silver Swan
 Flow Measurements on 7/14/2002 @ 3:10 pm
 Personnel: Alan Jewell, Steven Morgenstern

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	6	4.7	0	0.15	edge of water			0.00	0.44	0.308
2	10.7	0.8	0.3	0.4	0.88	0.89	0.85	0.87	0.99	0.315
3	11.5	1.5	0.5	0.66	1.08	1.13	1.08	1.10	1.03	1.020
4	13	1.5	0.82	0.835	0.81	1.06	1.02	0.96	1.23	1.534
5	14.5	1.7	0.85	0.885	1.55	1.39	1.52	1.49	1.41	2.119
6	16.2	1.3	0.92	0.735	1.34	1.34	1.31	1.33	1.63	1.553
7	17.5	1.5	0.55	0.6	1.97	1.8	1.99	1.92	1.32	1.188
8	19	1.5	0.65	0.8	0.74	0.65	0.77	0.72	1.11	1.336
9	20.5	1.5	0.95	1.035	1.63	1.47	1.42	1.51	1.13	1.749
10	22	1.5	1.12	0.95	0.74	0.7	0.8	0.75	0.64	0.905
11	23.5	1.5	0.78	0.815	0.45	0.53	0.59	0.52	0.36	0.440
12	25	1.7	0.85	0.885	0.17	0.19	0.23	0.20	0.35	0.519
13	26.7	1.3	0.92	0.74	0.47	0.52	0.49	0.49	0.61	0.582
14	28	1.5	0.56	0.485	0.75	0.75	0.65	0.72	0.37	0.266
15	29.5	1.6	0.41	0.31	-0.02	0.01	0.05	0.01	0.01	0.003
16	31.1	0.4	0.21	0.105	-0.01	-0.02	-0.01	-0.01	-0.01	0.000
17	31.5		0	0	edge of water					

Total Flow (cfs): 13.836
 Total Flow (gpm): 6209.75

Note: USGS 09165000 at Dolores River below Rico, CO
 @ 15:15 on 07/14/02 = 7 cfs

Rico AARCOE0105.00
DR-7-SW Silver Swan adit
Flow Measurements on 7/16/2002 @ 8:00 am
Personnel: Steven Morgenstern, Ana Vargo

width 1.65 Feet
Depth 0.05 Feet

Area of cross-section

0.0825 Square Feet; assuming rectangular section

0.0413 Square Feet; assuming v-ditch section

0.0619 Square Feet; average cross-section

length of time trial 3.75 Feet

Time Trials

Notes

1	5.75 sec	center of channel
2	5.91 sec	center of channel
3	6.51 sec	center of channel
4	10.94 sec	west side of channel
5	7.6 sec	center of channel

6.4425 sec Average center of channel

0.582072 ft/sec average velocity at surface

cfs 0.036
gpm 16.16

Rico AARCOE0105.00
 DR-9-SW Rico Boy/Santa Cruz wetland outlet
 Flow Measurements on 7/17/2002 @ approximately 9:00 am
 Personnel: Steven Morgenstern, Ana Vargo

The flow is from two channels
 East Channel = approximately 75% of flow
 West Channel = approximately 25% of flow

NOTE: only measured approximate flow from east channel

	Area 1	Area 2	Area 3	Area 4	
Width	0.1	0.2	0.3	0.1	Feet
Depth	0.05	0.09	0.05	0.025	Feet
Area	0.005	0.018	0.015	0.0025	Square Feet

Area of cross-section 0.0405 Square Feet

length of time trial 3 Feet

Volume 0.12 Feet³

Time Trials		Notes
1	3.22 sec	center of channel
2	3.22 sec	center of channel
3	4 sec	center of channel
4	3.72 sec	center of channel
5	3.72 sec	center of channel
	3.576 sec	Average center of channel

	East Channel	West Channel	Total Flow
cfs	0.03	0.01	0.04
gpm	15.25	4.49	19.74

Rico AARCOE0105.00
DR-10-SW Rico Boy /Santa Cruz settling pond discharge
Flow Measurements on 7/17/2002 @ 8:00 am
Personnel: Steven Morgenstern, Ana Vargo

The settling pond discharge is dry

The settling pond was approximately 3 feet below crest, draining by seepage

Rico AARCOE0105.00
SVS-8 Silver Creek downstream of Argentine tailings
Flow Measurements on 7/18/2001 @ 10:05 am
Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	3.1	0.5	0	0.17	edge of water				0.02	0.002
2	3.6	0.4	0.34	0.395	0.04	0.04	0.06	0.05	0.04	0.007
3	4	0.4	0.45	0.415	0.05	0.04	0.03	0.04	0.10	0.017
4	4.4	0.4	0.38	0.44	0.18	0.18	0.14	0.17	0.10	0.017
5	4.8	0.4	0.5	0.53	0.03	0.03	0.02	0.03	0.03	0.005
6	5.2	0.45	0.56	0.575	0.03	0.02	0.02	0.02	0.02	0.004
7	5.65	0.6	0.59	0.58	0.01	0.02	0	0.01	0.27	0.095
8	6.25	0.55	0.57	0.49	0.55	0.53	0.53	0.54	0.46	0.123
9	6.8	0.4	0.41	0.315	0.35	0.39	0.39	0.38	0.48	0.061
10	7.2	0.5	0.22	0.25	0.59	0.58	0.59	0.59	0.32	0.040
11	7.7	1.4	0.28	0.14	0.05	0.06	0.05	0.05	0.03	0.005
21	9.1		0	0	edge of water					

Total Flow (cfs): 0.377
Total Flow (gpm): 169.0708

Rico AARCOE0105.00
SVS-12 Argentine tailings seep at source
Flow Measurements on 7/18/2002 @ 10:30 am
Personnel: Steven Morgenstern, Ana Vargo

3-inch Parshall Flume
used table

0.15 ft = 0.0527 cfs
23.66 gpm

Rico AARCOE0105.00
SVS-20 Silver Creek just above confluence with Dolores River
Flow Measurements on 7/18/2002 @ 7:55 am
Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	1.9	1.2	0	0.09	edge of water				0.03	0.003
2	3.1	0.4	0.18	0.155	0.05	0.05	0.06	0.05	0.03	0.002
3	3.5	0.35	0.13	0.175	0	0	0	0.00	0.12	0.007
4	3.85	0.55	0.22	0.225	0.22	0.29	0.22	0.24	0.22	0.028
5	4.4	0.5	0.23	0.325	0.19	0.24	0.18	0.20	0.29	0.048
6	4.9	0.55	0.42	0.46	0.34	0.37	0.44	0.38	0.28	0.070
7	5.45	0.55	0.5	0.41	0.13	0.18	0.2	0.17	0.09	0.020
8	6	0.5	0.32	0.31	0.02	0	0.01	0.01	-0.01	-0.001
9	6.5	0.4	0.3	0.265	-0.02	-0.02	-0.03	-0.02	-0.01	-0.001
10	6.9	1	0.23	0.115	0	0	-0.01	0.00	0.00	0.000
11	7.9		0	0	edge of water					

Total Flow (cfs): 0.175
Total Flow (gpm): 78.51

Rico AARCOE0105.00
SVS-22 Silver Creek just above Argentine tailings seep
Flow Measurements on 7/18/2002 @ 12:30 pm
Personnel: Steven Morgenstern, Ana Vargo

Shot Number	Distance (ft)	Distance btw shot numbers (ft)	Depth (ft) at shot number	Average depth btw two shot #s (ft)	velocity measurement #1 (ft/sec)	velocity measurement #2 (ft/sec)	velocity measurement #3 (ft/sec)	velocity measurement #4 (ft/sec)	Average velocity of #1-3 (ft/sec)	Average Flow Velocity btw two shot #s (ft/sec)	Segment Flow (cfs)
1	2.3	0.15	0	0.24	edge of water					0.01	0.000
2	2.45	0.25	0.48	0.465	0.02	0.03	0.02		0.02	0.01	0.001
3	2.7	0.75	0.45	0.59	0	-0.01	0		0.00	0.01	0.006
4	3.45	0.55	0.73	0.7	0.04	0.03	0.02		0.03	0.12	0.047
5	4	0.6	0.67	0.625	0.21	0.21	0.22		0.21	0.11	0.042
6	4.6	0.4	0.58	0.58	0.03	0	0		0.01	0.01	0.003
7	5	0.5	0.58	0.6	0.01	0.02	0.02		0.02	0.01	0.003
8	5.5	0.55	0.62	0.61	0.01	0	0		0.00	0.03	0.011
9	6.05	0.55	0.6	0.69	0.05	0.07	0.06		0.06	0.06	0.022
10	6.6	0.5	0.78	0.785	0.06	0.06	0.05		0.06	0.03	0.010
11	7.1	0.5	0.79	0.77	-0.01	0	-0.01		-0.01	0.01	0.004
12	7.6	1.1	0.75	0.775	0.04	0.02	0.03		0.03	0.03	0.027
13	8.7	0.6	0.8	0.765	0.01	0.02	0.06	0.04	0.03	0.08	0.035
14	9.3	0.5	0.73	0.625	0.13	0.12	0.11		0.12	0.19	0.058
15	9.8	0.5	0.52	0.46	0.22	0.28	0.25		0.25	0.27	0.061
16	10.3	0.7	0.4	0.325	0.26	0.32	0.26		0.28	0.11	0.026
17	11	0.7	0.25	0.125	-0.06	-0.05	-0.05		-0.05	-0.03	-0.002
18	11.7		0	0	edge of water						

Total Flow (cfs): 0.353
Total Flow (gpm): 158.5207

Rico AARCOE0105.00
SVS - 26 Unknown adit downstream of tramway, southside of Silver Creek
Flow Measurements on 7/19/2002 from 11:45 am
Personnel: Steven Morgenstern, Ana Vargo

	Water depth from bottom of bucket	Volume (cubic ft) (use attached table)	Time (seconds)	Flow (cfs)	Flow (gpm)
Test 1	0.55	0.89	184.47	0.0048	2.165
Test 2	0.55	0.89	183.37	0.0049	2.178
Test 3	0.69	0.899	228.32	0.0039	1.767

AVG assuming 98% of flow 0.0045 2.037

100% of the flow assuming 98% of the flow captured 0.0046 2.078

Note: Flow measurement using bucket captured 98% of the flow

Note: Used standard 5 gallon bucket (orange) and funnel

	minutes	seconds	Decimal Minutes	seconds
Test 1	3	4.47	3.07	184.47
Test 2	3	3.37	3.06	183.37
Test 3	3	48.32	3.81	228.32

Enter known data pairs:		
	height	inside
	(ft)	diameter (ft)
Data 1	0	0.85
Data 2	1.18	0.935

Query x (sta)	Result y (elev)	
water depth (ft)	w.s. diameter (ft)	volume (cubic ft)
0	0.850	0.000
0.05	0.854	0.020
0.1	0.857	0.041
0.15	0.861	0.061
0.2	0.864	0.082
0.25	0.868	0.104
0.3	0.872	0.125
0.35	0.875	0.147
0.4	0.879	0.169
0.45	0.882	0.191
0.5	0.886	0.214
0.55	0.890	0.236
0.565	0.891	0.243
0.595	0.893	0.257
0.6	0.893	0.259
0.65	0.897	0.283
0.7	0.900	0.306
0.725	0.902	0.318
0.75	0.904	0.330
0.8	0.908	0.354
0.85	0.911	0.378
0.9	0.915	0.403
0.95	0.918	0.428
1	0.922	0.453
1.05	0.926	0.478

APPENDIX A3

Chain of Custody Forms

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Quote #:

ACZ #:

CLIENT INFORMATION

Name to appear on Report and Invoice

Carbon Copy:

Report: _____

Invoice: _____

SEH, INC.

2637 MIDPOINT DR, Suite F

FORT COLLINS, CO 80525

Attn: S. MORGENSTERN Tel: 484-3611

Attn: _____

Tel: _____

Email: SMORGENSTERN@SEHINC.COM

Email: _____

PROJECT INFORMATION

ANALYSES REQUESTED (required; attach list)

Client Project name and/or PO#:

RICO/ST. LOUIS PONDS

AARLOE 0105.00.00011

Shipping Company:

Tracking #:

SAMPLE IDENTIFICATION	DATE/TIME	Matrix	# of Containers	TDS, TSS, CN, HARDNESS	DISSOLVED METALS	METALS - TOTAL RECOVERABLE	Fe II	Fe III	MERCURY		
DR-10-SW	7-17-02 (CA)	SW	5	X	A						
DR-19-SW	7-17-02 09:00	SW	5	X	A	B					
DR-27	7/17/02 10:45	SW	6	X	A	C	X	X			
DR-1-SW	7/17/02 11:45	SW	5	X	A	C	X				
SVS-20	7/17/02 13:45	SW							X		
DR-25	7/17/02 14:45	SW							X		
SVS-12	7/17/02 14:36	SW							X		
DR-24	7/17/02 14:57	SW							X		

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)

Options SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

A = Cd, Cu, Pb, Mn, Ni, Se, Ag, Zn

B = Cr, Fe

C = As, Cr, Fe

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	PAGE
STEVEN MORGENSTERN	7/17/02 15:00			Of

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Quote #:

ACZ #:

CLIENT INFORMATION

Name to appear on Report and Invoice

Carbon Copy:

Report:

Invoice:

SEH, INC.

2637 MIDPOINT DR, Ste F

FORT COLLINS, CO 80525

Attn: S. MORGENSTERN Tel: 970.361.4844

Attn:

Tel:

Email: SMORGENSTERN@SEHINC.COM

Email:

PROJECT INFORMATION

ANALYSES REQUESTED (required, attach list)

Client Project name and/or PO#:

RICO/ST LOUIS PONDS

AARCOE 0105.00.00011

Shipping Company: UPS

Tracking #:

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	TDS, TSS, CN, HARDNESS	DISSOLVED METALS	METALS - TOTAL RECOVERABLE	Fe II, Fe III	SULFATE, ACIDITY	MERCURY
DR-2	7/17/02 17:50	SW	5	X	A	B			
SVS-20	7/18/02 08:30	SW	5	X	A	B			
SVS-8	7/18/02 09:35	SW	5	X	A	B			
SVS-12	7/18/02 11:00	SW	5	X	A	C	X	X	
DR-24	7/18/02 10:45	SW	5	X	A	C	X	X	
DR-25	7/18/02 11:30	SW	5	X	A	C	X	X	
DR-7-SW	7/18/02 09:25	SW	1				X		
SVS-22	7/18/02 12:50	SW	5	X	A	B			
DR-7	7/18/02 14:10	SW	1						X
DR-3	7/18/02 14:20	SW	1						X

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)

Options: SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

A = Cd, Cu, Pb, Mn, Ni, Se, Ag, Zn

B = Cr, Fe

C = As, Cr, Fe

DR-7-SW → FILTER IN LAB; WAS NOT FILTERED IN FIELD

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME	PAGE
STEVEN MORGENSTERN	7/18/02 14:40			4
				Of

APPENDIX B

Analytical Report Package

Steven Morgenstern

August 12, 2002

SEH

2637 Midpoint Drive Suite F

Fort Collins, CO 80525

Project: L37682

Steven Morgenstern:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 18, 2002. This project has been assigned to ACZ's project number, L37682. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 9.0. The enclosed results relate only to the samples received under L37682. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 12, 2002. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



12/Aug/02

Sue Barkey, Project Manager, has reviewed and accepted this report in its entirety.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE0105.00.00011

Sample ID: DR-9-SW

ACZ ID: L37682-01

Date Sampled: 07/17/02 09:00

Date Received: 07/18/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/01/02 23:03	bf
Calcium, dissolved	M200.7 ICP	134		mg/L	0.2	1	08/01/02 23:03	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 7:23	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/02/02 2:24	lcj
Iron, total recoverable	M200.7 ICP	1.69		mg/L	0.01	0.05	07/30/02 15:54	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0005	0.003	08/04/02 5:20	lcj
Magnesium, dissolved	M200.7 ICP	21.9		mg/L	0.2	1	08/06/02 21:02	kdw
Manganese, dissolved	M200.7 ICP	9.060		mg/L	0.005	0.03	08/06/02 21:02	kdw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/06/02 21:02	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 2:24	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 2:24	lcj
Zinc, dissolved	M200.7 ICP	0.04	B	mg/L	0.01	0.05	08/01/02 23:03	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP						07/29/02 11:52	dlim
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 16:36	jb

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:33	kb
Hardness as CaCO ₃	SM2340B - Calculation	425		mg/L	1	7	08/12/02 8:37	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	540		mg/L	10	20	07/19/02 10:07	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	12	B	mg/L	5	20	07/19/02 12:18	lsa

SEH

Project ID: AARCOE0105.00.00011

Sample ID: DR-27

ACZ ID: L37682-02

Date Sampled: 07/17/02 10:45

Date Received: 07/18/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS		U	mg/L	0.0005	0.003	08/02/02 7:37	lcj
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/01/02 23:07	bf
Calcium, dissolved	M200.7 ICP	306		mg/L	0.2	1	08/01/02 23:07	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 7:37	lcj
Copper, dissolved	M200.8 ICP-MS	0.010		mg/L	0.001	0.005	08/02/02 4:50	lcj
Iron, Ferric	Calculation (Total Fe - Ferrous Fe)		U	mg/L	0.01	0.01	08/12/02 0:00	calc
Iron, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	08/10/02 15:12	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/02/02 4:50	lcj
Magnesium, dissolved	M200.7 ICP	43.0		mg/L	0.2	1	08/06/02 21:06	kdw
Manganese, dissolved	M200.7 ICP	0.086		mg/L	0.005	0.03	08/06/02 21:06	kdw
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:03	lcj
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/06/02 21:06	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 4:50	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 4:50	lcj
Zinc, dissolved	M200.7 ICP	0.92		mg/L	0.01	0.05	08/01/02 23:07	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP						07/31/02 11:52	dln
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 16:50	jb

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:34	kb
Hardness as CaCO ₃	SM2340B - Calculation	942		mg/L	1	7	08/12/02 0:00	calc
Iron, Ferrous	SM 3500 Fe-D		UH	mg/L	0.01	0.05	07/19/02 19:14	wfg
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1160		mg/L	10	20	07/19/02 10:09	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	10	B	mg/L	5	20	07/19/02 12:22	lsa

Note: Sample was received and analyzed after the holdtime for Ferrous Iron analysis had expired.

SEH

Project ID: AARCOE0105.00.00011

Sample ID: DR-1-SW

ACZ ID: L37682-03

Date Sampled: 07/17/02 11:45

Date Received: 07/18/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS		U	mg/L	0.001	0.005	08/02/02 7:42	lcj
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/01/02 23:12	bf
Calcium, dissolved	M200.7 ICP	86.1		mg/L	0.2	1	08/01/02 23:12	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/02/02 7:42	lcj
Copper, dissolved	M200.8 ICP-MS	0.003	B	mg/L	0.001	0.005	08/02/02 4:55	lcj
Iron, Ferric	Calculation (Total Fe - Ferrous Fe)		U	mg/L	0.01	0.01	08/12/02 0:00	calc
Iron, total recoverable	M200.7 ICP	0.53		mg/L	0.01	0.05	08/10/02 15:16	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/02/02 4:55	lcj
Magnesium, dissolved	M200.7 ICP	10.6		mg/L	0.2	1	08/06/02 21:20	kdw
Manganese, dissolved	M200.7 ICP	0.188		mg/L	0.005	0.03	08/06/02 21:20	kdw
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:16	lcj
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/06/02 21:20	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 4:55	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 4:55	lcj
Zinc, dissolved	M200.7 ICP	0.58		mg/L	0.01	0.05	08/01/02 23:12	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP						07/31/02 12:12	djm
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 17:03	jb

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:36	kb
Hardness as CaCO ₃	SM2340B - Calculation	259		mg/L	1	7	08/12/02 0:00	calc
Iron, Ferrous	SM 3500 Fe-D	0.02	BH	mg/L	0.01	0.05	07/19/02 19:21	wfg
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	340		mg/L	10	20	07/19/02 10:12	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	10	B	mg/L	5	20	07/19/02 12:26	lsa

Note: Sample was received and analyzed after the holdtime for Ferrous Iron analysis had expired.

SEH

Project ID: AARCOE0105.00.00011

Sample ID: SVS-20

ACZ ID: **L37682-04**

Date Sampled: 07/17/02 13:45

Date Received: 07/18/02

Sample Matrix: *Surface Water***Metals Analysis**

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:25	lcj

SEH

Project ID: AARCOE0105.00.00011

Sample ID: DR-25

ACZ ID: L37682-05

Date Sampled: 07/17/02 14:45

Date Received: 07/18/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:30	lcj

SEH

Project ID: AARCOE0105.00.00011

Sample ID: SVS-12

ACZ ID: **L37682-06**

Date Sampled: 07/17/02 14:36

Date Received: 07/18/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:34	lcj

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE0105.00.00011

Sample ID: DR-24

ACZ ID: L37682-07

Date Sampled: 07/17/02 14:57

Date Received: 07/18/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:48	lcj

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

ACZ Laboratories, Inc.

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Sample Receipt

SEH
AARCOE0105.00.00011

ACZ Project ID: L37682
Date Received: 7/18/02
Received By: TONYA

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			✓
2) Are the custody seals on the cooler intact?	✓		
3) Are the custody seals on the sample containers intact?			✓
4) Is there a Chain of Custody or other directive shipping papers present?	✓		
5) Is the Chain of Custody complete?	✓		
6) Is the Chain of Custody in agreement with the samples received?	✓		
7) Is there enough sample for all requested analyses?	✓		
8) Are all samples within holding times for requested analyses?	✓		
9) Were all sample containers received intact?	✓		
10) Are the temperature blanks present?	✓		
11) Are the trip blanks (VOA and/or Cyanide) present?			✓
12) Are samples requiring no headspace, headspace free?			✓
13) Do the samples that require a Foreign Soils Permit have one?			✓

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (μR/hr)
ACZ	8.7	12

Notes

SAMPLES MARKED AS 'NO' WERE pH=6 - ADDED 2mL NaOH RESULTING IN A pH=2.

SEH
AARCOE0105.00.00011

ACZ Project ID: L37682
Date Received: 7/18/02
Received By: TONYA

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L37682-01	DR-9-SW	N	Y							Y		
L37682-02	DR-27	Y	Y							Y		
L37682-03	DR-1-SW	N	Y							Y		
L37682-04	SVS-20										0	
L37682-05	DR-25										0	
L37682-06	SVS-12										0	
L37682-07	DR-24										0	

ACZ Laboratories, Inc.

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CHAIN of CUSTODY

Quote #: _____ ACZ #: L37682

CLIENT INFORMATION

Name to appear on Report and Invoice: SEH, INC. Carbon Copy: _____ Report: _____ Invoice: _____
2637 MIDPOINT DR, Suite F
FORT COLLINS, CO 80525
 Attn: S. MORGENSTEIN Tel: 484-3611 Attn: _____ Tel: _____
 Email: SMORGENSTEIN@SEHINC.COM Email: _____

PROJECT INFORMATION

ANALYSES REQUESTED (required; attach list)

Client Project name and/or PO#:

RICO/ST. LOUIS PONDS
AARLOE 0105.00.00011

Shipping Company:

Tracking #:

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	TDS, TSS, CN, HARDNESS	DISSOLVED METALS	METALS - TOTAL RECOVERABLE	Fe II	Fe III	MERCURY		
DR-10-SW	7-17-02 (ca)	SW	5	X	A						
DR-9-SW	7-17-02 09:00	SW	5	X	A	B					
DR-27	7/17/02 10:45	SW	6	X	A	C	X	X			
DR-1-SW	7/17/02 11:45	SW	5	X	A	C	X	X			
SVS-20	7/17/02 13:45	SW							X		
DA-25	7/17/02 14:45	SW							X		
SVS-12	7/17/02 14:36	SW							X		
DR-24	7/17/02 14:57	SW							X		

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)
 Options SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

A = Cd, Cu, Pb, Mn, Ni, Se, Ag, Zn
 B = Cr, Fe
 C = As, Cr, Fe

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME	PAGE
STEVEN MORGENSTEIN	7/17/02 15:00	<u>[Signature]</u>	07/18/02 10:30	Of

TABLE 2
Analytical Procedures Summary

Parameter	Detection Limit	Method
Field Parameters		
pH (s.u.)	---	EPA 150.1
Temperature (°C)	---	Standard Method 2550
Conductivity (µmhos/cm)	---	EPA 120.1
Alkalinity (mg/L as CaCO ₃)	5 mg/L	EPA 310.1
General Parameters		
Hardness (mg/L as CaCO ₃)	1 mg/L	EPA 6010/130.2
Total Dissolved Solids (mg/L as TDS)	10 mg/L	EPA 160.1
Total Suspended Solids (mg/L as TSS)	5 mg/L	EPA 160.2
Trace Metals		
Arsenic (µg/L as As)	0.5 µg/L	ICP-MS
Chromium (µg/L as Cr)	.05 µg/L	ICP-MS
Cadmium (µg/L as Cd)	3 µg/L	ICP
Copper (µg/L as Cu)	0.5 µg/L	ICP-MS
Cyanide (µg/L as CN)	5-10 µg/L	Low-level WAD
Iron (µg/L as Fe)	10 µg/L	ICP
Lead (µg/L as Pb)	0.1 µg/L	ICP-MS
Manganese (µg/L as Mn)	5 µg/L	ICP
Mercury (µg/L as Hg)	0.000020 µg/L	EPA-1631
Nickel (µg/L as Ni)	10 µg/L	ICP
Selenium (µg/L as Se)	1.5µg/L	ICP-MS
Silver (µg/L as Ag)	0.05 µg/L	ICP-MS
Zinc (µg/L as Zn)	10 µg/L	ICP

5.0 Flow Measurement Methods

Discharge measurements will be conducted in accordance with the measurement procedures used for the Rico site remediation as well as USGS standard discharge measurement procedures. Flows will be measured by one of three methods (1) a Marsh-McBirney Model 2000 portable flow meter, (2) Parshall flume, or (3) volumetric procedure using a 5-gallon bucket.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

Steven Morgenstern

August 15, 2002

SEH

2637 Midpoint Drive Suite F

Fort Collins, CO 80525

Project: L37692

Steven Morgenstern:

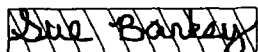
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 19, 2002. This project has been assigned to ACZ's project number, L37692. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 9.0. The enclosed results relate only to the samples received under L37692. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 15, 2002. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



15/Aug/02

Sue Barkey, Project Manager, has reviewed and accepted this report in its entirety.

SEH

August 15, 2002

Project: L37692

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 10 samples from SEH on July 19, 2002. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L37692. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for the following:

1. The Ferrous Iron samples were received with too little remaining time to analyze them within the hold time of 24 hours. However, they were analyzed on the day received, 07/19/02.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following anomalies were identified during the analysis of these samples:

1. Total Recoverable Iron was not analyzed for on sample L37692-07. The proper sub-sample was not received (red dot bottle preserved with nitric acid).

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-2

ACZ ID: L37692-01

Date Sampled: 07/17/02 17:50

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/02/02 23:09	bf
Calcium, dissolved	M200.7 ICP	73.3		mg/L	0.2	1	08/02/02 23:09	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0001	B	mg/L	0.0001	0.0005	08/02/02 7:47	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/02/02 5:00	lcj
Iron, total recoverable	M200.7 ICP	0.09		mg/L	0.01	0.05	08/10/02 15:20	bf
Lead, dissolved	M200.8 ICP-MS	0.0003	B	mg/L	0.0002	0.001	08/02/02 5:00	lcj
Magnesium, dissolved	M200.7 ICP	9.3		mg/L	0.2	1	08/02/02 23:09	bf
Manganese, dissolved	M200.7 ICP	0.307		mg/L	0.005	0.03	08/02/02 23:09	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/02/02 23:09	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 5:00	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 5:00	lcj
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	08/02/02 23:09	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 17:17	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 12:31	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:37	kb
Hardness as CaCO ₃	SM2340B - Calculation	221		mg/L	1	7	08/14/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	240		mg/L	10	20	07/19/02 14:47	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	10	B	mg/L	5	20	07/19/02 12:55	lsa

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: SVS-20

ACZ ID: L37692-02

Date Sampled: 07/18/02 08:30

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP	0.004	B	mg/L	0.003	0.02	08/02/02 23:25	bf
Calcium, dissolved	M200.7 ICP	119		mg/L	0.2	1	08/02/02 23:25	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 7:52	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/02/02 5:04	lcj
Iron, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	08/10/02 20:21	bf
Lead, dissolved	M200.8 ICP-MS	0.0005	B	mg/L	0.0002	0.001	08/02/02 5:04	lcj
Magnesium, dissolved	M200.7 ICP	13.3		mg/L	0.2	1	08/02/02 23:25	bf
Manganese, dissolved	M200.7 ICP	0.012	B	mg/L	0.005	0.03	08/02/02 23:25	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/02/02 23:25	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 5:04	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 5:04	lcj
Zinc, dissolved	M200.7 ICP	0.47		mg/L	0.01	0.05	08/02/02 23:25	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 17:30	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 9:57	dlm

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:37	kb
Hardness as CaCO ₃	SM2340B - Calculation	352		mg/L	1	7	08/14/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	420		mg/L	10	20	07/19/02 14:50	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/19/02 12:59	lsa

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: SVS-8

ACZ ID: L37692-03

Date Sampled: 07/18/02 09:35

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP	0.003	B	mg/L	0.003	0.02	08/02/02 23:29	bf
Calcium, dissolved	M200.7 ICP	107		mg/L	0.2	1	08/02/02 23:29	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0001	B	mg/L	0.0001	0.0005	08/02/02 7:56	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/02/02 5:19	lcj
Iron, total recoverable	M200.7 ICP	0.09		mg/L	0.01	0.05	08/10/02 15:35	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/02/02 5:19	lcj
Magnesium, dissolved	M200.7 ICP	15.0		mg/L	0.2	1	08/02/02 23:29	bf
Manganese, dissolved	M200.7 ICP	0.648		mg/L	0.005	0.03	08/02/02 23:29	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/02/02 23:29	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 5:19	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 5:19	lcj
Zinc, dissolved	M200.7 ICP	0.94		mg/L	0.01	0.05	08/02/02 23:29	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 17:43	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 13:28	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:38	kb
Hardness as CaCO3	SM2340B - Calculation	329		mg/L	1	7	08/14/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	370		mg/L	10	20	07/19/02 14:57	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	6	B	mg/L	5	20	07/20/02 17:05	wfg

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: SVS-12

ACZ ID: L37692-04

Date Sampled: 07/18/02 11:00

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS	0.0008	B	mg/L	0.0005	0.003	08/02/02 8:01	lcj
Cadmium, dissolved	M200.7 ICP	0.004	B	mg/L	0.003	0.02	08/06/02 21:24	kdw
Calcium, dissolved	M200.7 ICP	232		mg/L	0.2	1	08/02/02 23:41	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 8:01	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/02/02 5:33	lcj
Iron, Ferric	Calculation (TR Fe - Ferrous Fe)	2.7		mg/L	0.1	0.1	08/14/02 0:00	calc
Iron, total recoverable	M200.7 ICP	5.78		mg/L	0.01	0.05	08/07/02 20:51	bf
Lead, dissolved	M200.8 ICP-MS	0.0017		mg/L	0.0002	0.001	08/02/02 5:33	lcj
Magnesium, dissolved	M200.7 ICP	41.5		mg/L	0.2	1	08/02/02 23:41	bf
Manganese, dissolved	M200.7 ICP	7.200		mg/L	0.005	0.03	08/02/02 23:41	bf
Nickel, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	08/06/02 21:24	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/02/02 5:33	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 5:33	lcj
Zinc, dissolved	M200.7 ICP	6.11		mg/L	0.01	0.05	08/02/02 23:41	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 17:57	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 13:48	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity as CaCO ₃	SM2310B - Titration		U	mg/L	2	10	07/22/02 13:11	ecr
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:40	kb
Hardness as CaCO ₃	SM2340B - Calculation	751		mg/L	1	7	08/14/02 0:00	calc
Iron, Ferrous	SM 3500 Fe-D	3.0	H	mg/L	0.1	0.5	07/19/02 19:29	wfg
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1010		mg/L	10	20	07/22/02 9:45	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	8	B	mg/L	5	20	07/20/02 17:08	wfg
Sulfate	M375.3 - Gravimetric	560		mg/L	10	20	07/19/02 16:42	ey

Note: Sample was received and analyzed after the holdtime for Ferrous Iron analysis had expired.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-24

ACZ ID: L37692-05

Date Sampled: 07/18/02 10:45

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS	0.0008	B	mg/L	0.0005	0.003	08/02/02 8:05	lcj
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/02/02 23:45	bf
Calcium, dissolved	M200.7 ICP	239		mg/L	0.2	1	08/02/02 23:45	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 8:05	lcj
Copper, dissolved	M200.8 ICP-MS	0.001	B	mg/L	0.001	0.005	08/03/02 23:22	lcj
Iron, Ferric	Calculation (TR Fe - Ferrous Fe)	2.3		mg/L	0.1	0.1	08/14/02 0:00	calc
Iron, total recoverable	M200.7 ICP	5.42		mg/L	0.01	0.05	08/07/02 21:04	bf
Lead, dissolved	M200.8 ICP-MS	0.0011		mg/L	0.0002	0.001	08/03/02 23:22	lcj
Magnesium, dissolved	M200.7 ICP	43.3		mg/L	0.2	1	08/02/02 23:45	bf
Manganese, dissolved	M200.7 ICP	7.520		mg/L	0.005	0.03	08/02/02 23:45	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/02/02 23:45	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/03/02 23:22	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/03/02 23:22	lcj
Zinc, dissolved	M200.7 ICP	6.22		mg/L	0.01	0.05	08/02/02 23:45	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP						07/31/02 14:07	dln
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 18:10	jb

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity as CaCO ₃	SM2310B - Titration		U	mg/L	2	10	07/22/02 14:07	ecr
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:41	kb
Hardness as CaCO ₃	SM2340B - Calculation	775		mg/L	1	7	08/14/02 0:00	calc
Iron, Ferrous	SM 3500 Fe-D	3.1	H	mg/L	0.1	0.5	07/19/02 19:36	wfg
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1020		mg/L	10	20	07/22/02 9:46	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	10	B	mg/L	5	20	07/20/02 17:10	wfg
Sulfate	M375.3 - Gravimetric	560		mg/L	10	20	07/19/02 16:46	ey

Note: Sample was received and analyzed after the holdtime for Ferrous Iron analysis had expired.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-25

ACZ ID: L37692-06

Date Sampled: 07/18/02 11:30

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS		U	mg/L	0.0005	0.003	08/02/02 8:10	lcj
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/02/02 23:49	bf
Calcium, dissolved	M200.7 ICP		U	mg/L	0.2	1	08/02/02 23:49	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0009		mg/L	0.0001	0.0005	08/02/02 8:10	lcj
Copper, dissolved	M200.8 ICP-MS		U	mg/L	0.001	0.005	08/03/02 23:27	lcj
Iron, Ferric	Calculation (TR Fe - Ferrous Fe)		U	mg/L	0.01	0.01	08/14/02 0:00	calc
Iron, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	08/10/02 15:38	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/03/02 23:27	lcj
Magnesium, dissolved	M200.7 ICP		U	mg/L	0.2	1	08/02/02 23:49	bf
Manganese, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	08/02/02 23:49	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/02/02 23:49	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/03/02 23:27	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/03/02 23:27	lcj
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	08/02/02 23:49	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 18:24	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 14:26	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity as CaCO3	SM2310B - Titration	10	B	mg/L	2	10	07/22/02 14:35	ecr
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:42	kb
Hardness as CaCO3	SM2340B - Calculation	n/a		mg/L	1	7	08/14/02 0:00	calc
Iron, Ferrous	SM 3500 Fe-D		UH	mg/L	0.01	0.05	07/19/02 19:43	wfg
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric		U	mg/L	10	20	07/22/02 9:48	isa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/20/02 17:13	wfg
Sulfate	M375.3 - Gravimetric		U	mg/L	10	20	07/19/02 16:50	ey

Note: Sample was received and analyzed after the holdtime for Ferrous Iron analysis had expired.

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-7-SW

ACZ ID: L37692-07

Date Sampled: 07/18/02 09:25

Date Received: 07/19/02

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Iron, Ferrous	SM 3500 Fe-D	8.2	H	mg/L	0.1	0.5	07/19/02 19:50	wfg
Lab Filtration	SM 3030 B						07/19/02 15:00	lsa
Lab Filtration & Acidification	SM 3030 B						07/23/02 23:07	ey

Note: Sample was received and analyzed after the holdtime for Ferrous Iron analysis had expired.

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: SVS-22

ACZ ID: L37692-08

Date Sampled: 07/18/02 12:50

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP	0.004	B	mg/L	0.003	0.02	08/02/02 23:53	bf
Calcium, dissolved	M200.7 ICP	49.4		mg/L	0.2	1	08/02/02 23:53	bf
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 8:15	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/03/02 23:43	lcj
Iron, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	08/10/02 15:42	bf
Lead, dissolved	M200.8 ICP-MS	0.0005	B	mg/L	0.0002	0.001	08/03/02 23:43	lcj
Magnesium, dissolved	M200.7 ICP	5.0		mg/L	0.2	1	08/02/02 23:53	bf
Manganese, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	08/02/02 23:53	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/02/02 23:53	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/03/02 23:43	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/03/02 23:43	lcj
Zinc, dissolved	M200.7 ICP	0.42		mg/L	0.01	0.05	08/02/02 23:53	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP						07/31/02 14:45	dln
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 18:37	jb

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:43	kb
Hardness as CaCO ₃	SM2340B - Calculation	144		mg/L	1	7	08/14/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	180		mg/L	10	20	07/19/02 15:00	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/20/02 17:16	wfg

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Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-7

ACZ ID: L37692-09

Date Sampled: 07/18/02 14:10

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 14:53	lcj

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Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-3

ACZ ID: L37692-10

Date Sampled: 07/18/02 14:20

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 15:06	lcj

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

<i>B</i>	Analyte concentration detected at a value between MDL and PQL.
<i>H</i>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<i>R</i>	Poor spike recovery accepted because the other spike in the set fell within the given limits.
<i>T</i>	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
<i>U</i>	Analyte was analyzed for but not detected at the indicated MDL
<i>V</i>	High blank data accepted because sample concentration is 10 times higher than blank concentration
<i>W</i>	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
<i>X</i>	Quality control sample is out of control.
<i>Z</i>	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

SEH
AARCOE0105.00.00011

ACZ Project ID: L37692
Date Received: 7/19/02
Received By: TONYA

Receipt Verification

- 1) Does this project require special handling procedures such as CLP protocol?
- 2) Are the custody seals on the cooler intact?
- 3) Are the custody seals on the sample containers intact?
- 4) Is there a Chain of Custody or other directive shipping papers present?
- 5) Is the Chain of Custody complete?
- 6) Is the Chain of Custody in agreement with the samples received?
- 7) Is there enough sample for all requested analyses?
- 8) Are all samples within holding times for requested analyses?
- 9) Were all sample containers received intact?
- 10) Are the temperature blanks present?
- 11) Are the trip blanks (VOA and/or Cyanide) present?
- 12) Are samples requiring no headspace, headspace free?
- 13) Do the samples that require a Foreign Soils Permit have one?

YES	NO	NA
		✓
✓		
		✓
✓		
✓		
✓		
✓		
✓		
	✓	
		✓
		✓

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
ACZ	11.9	12

Notes

ACZ Laboratories, Inc.

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Sample Receipt

SEH
AARCOE0105.00.00011

ACZ Project ID: L37692
Date Received: 7/19/02
Received By: TONYA

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L37692-01	DR-2	Y	Y							Y		
L37692-02	SVS-20	Y	Y							Y		
L37692-03	SVS-8	Y	Y							Y		
L37692-04	SVS-12	Y	Y							Y		
L37692-05	DR-24	Y	Y							Y		
L37692-06	DR-25	Y	Y							Y		
L37692-07	DR-7-SW										0	
L37692-08	SVS-22	Y	Y							Y		
L37692-09	DR-7	Y										
L37692-10	DR-3	Y										

ACZ Laboratories, Inc.

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CHAIN of CUSTODY

Quote #:

ACZ #: C37692

CLIENT INFORMATION

Name to appear on Report and Invoice

Carbon Copy:

Report:

Invoice:

SEH, INC.

2637 MIDPOINT DR, Ste F

FORT COLLINS, CO 80525

Attn: S. MORGENSTERN Tel: 484.3611

Attn:

Tel:

Email: SMORGENSTERN@SEHINC.COM

Email:

PROJECT INFORMATION

ANALYSES REQUESTED (required, attach list)

Client Project name and/or PO#:

RICO/ST LOUIS PONDS

AARCOE 0105.00.00011

Shipping Company: UPS

Tracking #:

SAMPLE IDENTIFICATION DATE:TIME Matrix

of Containers

TD, TSS, CN, HARDNESS

DISSOLVED METALS

METALS - TOTAL RECOVERABLE

Fe II, Fe III

SULFATE, ACIDITY

MERCURY

DR-2

7/17/02 17:50

SW

5

X

A

B

SVS-20

7/18/02 08:30

SW

5

X

A

B

SVS-8

7/18/02 09:35

SW

5

X

A

B

SVS-12

7/18/02 11:00

SW

5

X

A

C

X

X

DR-24

7/18/02 10:45

SW

5

X

A

C

X

X

DR-25

7/18/02 11:30

SW

5

X

A

C

X

X

DR-7-SW

7/18/02 09:25

SW

1

X

SVS-22

7/18/02 12:50

SW

5

X

A

B

DR-7

7/18/02 14:10

SW

1

X

DR-3

7/18/02 14:20

SW

1

X

Matrix Options

SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)
SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

A = Cd, Cu, Pb, Mn, Ni, Se, Ag, Zn

B = Cr, Fe

C = As, Cr, Fe

DR-7-SW → FILTER IN LAB; WAS NOT FILTERED IN FIELD

RELINQUISHED BY:

DATE:TIME

RECEIVED BY:

DATE:TIME

PAGE

STEVEN MORGENSTERN

7/18/02 14:40

[Signature]

07/19/02 1:30

Of

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

Steven Morgenstern

August 14, 2002

SEH

2637 Midpoint Drive Suite F

Fort Collins, CO 80525

Project: L37693

Steven Morgenstern:

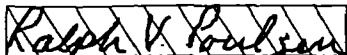
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 19, 2002. This project has been assigned to ACZ's project number, L37693. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 9.0. The enclosed results relate only to the samples received under L37693. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 14, 2002. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



14/Aug/02

Ralph V. Poulsen, President, has reviewed and accepted this report in its entirety.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCO E0105.00.00011

Sample ID: DR-7-SW

ACZ ID: L37693-01

Date Sampled: 07/16/02 08:40

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS	0.0051		mg/L	0.0005	0.003	07/27/02 20:28	lcj
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	07/29/02 20:40	ct
Calcium, dissolved	M200.7 ICP	333		mg/L	0.2	1	07/29/02 20:40	ct
Chromium, total recoverable	M200.8 ICP-MS	0.0015		mg/L	0.0001	0.0005	07/31/02 3:14	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/01/02 2:13	lcj
Iron, total recoverable	M200.7 ICP	14.70		mg/L	0.01	0.05	08/08/02 1:25	bf
Lead, dissolved	M200.8 ICP-MS	0.0013		mg/L	0.0002	0.001	07/30/02 20:45	jb
Magnesium, dissolved	M200.7 ICP	50.1		mg/L	0.2	1	07/29/02 20:40	ct
Manganese, dissolved	M200.7 ICP	2.690		mg/L	0.005	0.03	07/29/02 20:40	ct
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 15:15	lcj
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	07/29/02 20:40	ct
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:45	jb
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	07/30/02 20:45	jb
Zinc, dissolved	M200.7 ICP	0.88		mg/L	0.01	0.05	07/29/02 20:40	ct

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 21:15	jb
Total Recoverable Digestion	M200.2 ICP						07/29/02 11:14	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity as CaCO ₃	SM2310B - Titration		U	mg/L	2	10	07/22/02 15:03	ecr
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:43	kb
Hardness as CaCO ₃	SM2340B - Calculation	1040		mg/L	1	7	08/07/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1240		mg/L	10	20	07/19/02 15:04	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	30		mg/L	5	20	07/19/02 13:03	lsa
Sulfate	M375.3 - Gravimetric	300		mg/L	10	20	07/19/02 16:54	ey

Note: The Total Recoverable Iron value is estimated due to matrix interferences.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCO E0105.00.00011

Sample ID: DR-7

ACZ ID: L37693-02

Date Sampled: 07/16/02 12:10

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/01/02 23:16	bf
Calcium, dissolved	M200.7 ICP	77.4		mg/L	0.2	1	08/01/02 23:16	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0017		mg/L	0.0001	0.0005	07/31/02 3:19	lcj
Copper, dissolved	M200.8 ICP-MS	0.001	B	mg/L	0.001	0.005	08/01/02 2:27	lcj
Iron, total recoverable	M200.7 ICP	0.17		mg/L	0.01	0.05	08/01/02 6:42	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	07/30/02 20:50	jb
Magnesium, dissolved	M200.7 ICP	11.7		mg/L	0.2	1	08/06/02 21:29	kdw
Manganese, dissolved	M200.7 ICP	0.316		mg/L	0.005	0.03	08/06/02 21:29	kdw
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 15:20	lcj
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/06/02 21:29	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:50	jb
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	07/30/02 20:50	jb
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	08/01/02 23:16	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 21:30	jb
Total Recoverable Digestion	M200.2 ICP						07/29/02 12:12	dlm

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:44	kb
Hardness as CaCO ₃	SM2340B - Calculation	242		mg/L	1	7	08/07/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	320		mg/L	10	20	07/19/02 15:07	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	6	B	mg/L	5	20	07/19/02 13:07	lsa

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: AARCO E0105.00.00011

Sample ID: DR-6

ACZ ID: L37693-03

Date Sampled: 07/16/02 13:30

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS		U	mg/L	0.0005	0.003	07/27/02 20:37	lcj
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/01/02 23:20	bf
Cadmium, potentially dissolved	M200.7 ICP	0.015	B	mg/L	0.006	0.03	08/07/02 20:00	bf
Calcium, dissolved	M200.7 ICP	314		mg/L	0.2	1	08/01/02 23:20	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0016		mg/L	0.0001	0.0005	07/31/02 3:23	lcj
Copper, dissolved	M200.8 ICP-MS	0.003	B	mg/L	0.001	0.005	08/02/02 5:38	lcj
Copper, potentially dissolved	M200.8 ICP-MS	0.0028	B	mg/L	0.0005	0.003	07/26/02 0:38	lcj
Iron, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	08/12/02 11:40	ct
Iron, potentially dissolved	M200.7 ICP	0.49		mg/L	0.02	0.1	08/07/02 20:00	bf
Iron, total recoverable	M200.7 ICP	0.39		mg/L	0.01	0.05	07/30/02 16:01	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	07/30/02 20:54	jb
Lead, potentially dissolved	M200.8 ICP-MS	0.0007	B	mg/L	0.0005	0.003	07/26/02 18:55	jb
Magnesium, dissolved	M200.7 ICP	34.0		mg/L	0.2	1	08/06/02 21:34	kdw
Manganese, dissolved	M200.7 ICP	0.505		mg/L	0.005	0.03	08/06/02 21:34	kdw
Manganese, potentially dissolved	M200.7 ICP	0.506		mg/L	0.005	0.03	08/06/02 15:12	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/06/02 21:34	kdw
Nickel, potentially dissolved	M200.7 ICP	0.08	B	mg/L	0.02	0.1	08/07/02 20:00	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:54	jb
Selenium, potentially dissolved	M200.8 ICP-MS		U	mg/L	0.008	0.04	07/26/02 18:55	jb
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	07/30/02 20:54	jb
Silver, potentially dissolved	M200.8 ICP-MS		U	mg/L	0.0003	0.001	07/26/02 18:55	jb
Zinc, dissolved	M200.7 ICP	0.41		mg/L	0.01	0.05	08/01/02 23:20	bf
Zinc, potentially dissolved	M200.7 ICP	0.45		mg/L	0.01	0.05	08/06/02 15:12	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidify and filter (PD)	Potentially dissolved (CO WQCC)						07/25/02 3:27	ct
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 21:45	jb
Total Recoverable Digestion	M200.2 ICP						07/29/02 12:31	dln

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: AARCO E0105.00.00011

Sample ID: DR-6

ACZ ID: L37693-03

Date Sampled: 07/16/02 13:30

Date Received: 07/19/02

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:45	kb
Hardness as CaCO3	SM2340B - Calculation	925		mg/L	1	7	08/07/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1350		mg/L	10	20	07/19/02 15:10	lsa
Residue, Non- Filterable (TSS) @105C	M160.2 - Gravimetric	16	B	mg/L	5	20	07/19/02 13:11	lsa

Note: The Dissolved Iron value is estimated due to matrix interferences.

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Inorganic Analytical Results

SEH

Project ID: AARCO E0105.00.00011

Sample ID: DR-3

ACZ ID: L37693-04

Date Sampled: 07/16/02 14:20

Date Received: 07/19/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS	0.0017	B	mg/L	0.0005	0.003	07/27/02 20:42	lcj
Cadmium, dissolved	M200.7 ICP	0.013	B	mg/L	0.003	0.02	08/01/02 23:24	bf
Cadmium, total recoverable	M200.7 ICP	0.018	B	mg/L	0.003	0.02	08/08/02 22:56	bf
Calcium, dissolved	M200.7 ICP	259		mg/L	0.2	1	08/01/02 23:24	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0098		mg/L	0.0005	0.003	07/31/02 3:28	lcj
Copper, dissolved	M200.8 ICP-MS	0.020		mg/L	0.003	0.01	08/01/02 2:36	lcj
Copper, total recoverable	M200.8 ICP-MS	0.25		mg/L	0.01	0.05	08/02/02 7:09	lcj
Iron, dissolved	M200.7 ICP	2.63		mg/L	0.01	0.05	08/12/02 11:43	ct
Iron, total recoverable	M200.7 ICP	13.90		mg/L	0.01	0.05	08/07/02 21:16	bf
Lead, dissolved	M200.8 ICP-MS	0.0167		mg/L	0.0002	0.001	07/30/02 20:59	jb
Lead, potentially dissolved	M200.8 ICP-MS	0.0160		mg/L	0.0002	0.001	08/07/02 1:06	lcj
Magnesium, dissolved	M200.7 ICP	23.1		mg/L	0.2	1	08/06/02 21:38	kdw
Manganese, dissolved	M200.7 ICP	2.050		mg/L	0.005	0.03	08/06/02 21:38	kdw
Manganese, total recoverable	M200.7 ICP	2.160		mg/L	0.005	0.03	08/07/02 21:16	bf
Mercury, total	M1631, Atomic Fluorescence		U	ug/L	0.0002	0.0005	08/06/02 15:24	lcj
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/06/02 21:38	kdw
Nickel, potentially dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/10/02 11:36	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:59	jb
Selenium, potentially dissolved	M200.8 ICP-MS		U	mg/L	0.002	0.008	08/06/02 21:24	jb
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	07/30/02 20:59	jb
Silver, potentially dissolved	M200.8 ICP-MS	0.00010	B	mg/L	5E-05	0.0003	08/06/02 21:24	jb
Zinc, dissolved	M200.7 ICP	3.43		mg/L	0.01	0.05	08/01/02 23:24	bf
Zinc, total recoverable	M200.7 ICP	3.28		mg/L	0.01	0.05	08/09/02 18:40	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidify and filter (PD)	Potentially dissolved (CO WQCC)						08/08/02 21:30	jb
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 22:00	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 15:04	dlim

SEH

Project ID: AARCO E0105.00.00011

Sample ID: DR-3

ACZ ID: **L37693-04**

Date Sampled: 07/16/02 14:20

Date Received: 07/19/02

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity as CaCO ₃	SM2310B - Titration		U	mg/L	2	10	07/22/02 15:32	ecr
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:46	kb
Hardness as CaCO ₃	SM2340B - Calculation	742		mg/L	1	7	08/07/02 0:00	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1120		mg/L	10	20	07/19/02 15:13	lsa
Residue, Non- Filterable (TSS) @105C	M160.2 - Gravimetric	46		mg/L	5	20	07/19/02 13:15	lsa
Sulfate	M375.3 - Gravimetric	700		mg/L	100	200	07/19/02 16:58	ey

Note: The Dissolved Iron value is estimated due to matrix interferences.

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

<i>B</i>	Analyte concentration detected at a value between MDL and PQL.
<i>H</i>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<i>R</i>	Poor spike recovery accepted because the other spike in the set fell within the given limits.
<i>T</i>	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
<i>U</i>	Analyte was analyzed for but not detected at the indicated MDL
<i>V</i>	High blank data accepted because sample concentration is 10 times higher than blank concentration
<i>W</i>	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
<i>X</i>	Quality control sample is out of control.
<i>Z</i>	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

ACZ Laboratories, Inc.

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Sample Receipt

SEH
AARCO E0105.00.00011

ACZ Project ID: L37693
Date Received: 7/19/02
Received By: TONYA

Receipt Verification

- 1) Does this project require special handling procedures such as CLP protocol?
- 2) Are the custody seals on the cooler intact?
- 3) Are the custody seals on the sample containers intact?
- 4) Is there a Chain of Custody or other directive shipping papers present?
- 5) Is the Chain of Custody complete?
- 6) Is the Chain of Custody in agreement with the samples received?
- 7) Is there enough sample for all requested analyses?
- 8) Are all samples within holding times for requested analyses?
- 9) Were all sample containers received intact?
- 10) Are the temperature blanks present?
- 11) Are the trip blanks (VOA and/or Cyanide) present?
- 12) Are samples requiring no headspace, headspace free?
- 13) Do the samples that require a Foreign Soils Permit have one?

YES	NO	NA
		✓
✓		
		✓
✓		
✓		
✓		
✓		
✓		
✓		
	✓	
		✓
		✓

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
ACZ	ROOM	14

Notes

SAMPLES MARKED AS 'NO' OUT OF pH RANGE - 1mL NaOH ADDED TO SAMPLE #01 (DR-7-SW)
AND 2mL HNO3 ADDED TO SAMPLES #02 AND 04(DR-7 AND DR-3).

SEH
AARCO E0105.00.00011

ACZ Project ID: L37693
Date Received: 7/19/02
Received By: TONYA

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L37693-01	DR-7-SW	Y	Y							N		
L37693-02	DR-7	N	Y							Y		
L37693-03	DR-6	Y	Y							Y		
L37693-04	DR-3	N	Y							Y		

Quote #:

ACZ #: 637693

CLIENT INFORMATION

Name to appear on Report and Invoice**Carbon Copy:**

Report:

Invoice:

SEH, INC.

2637 MIDPOINT DR, SUITE F

FORT COLLINS, CO 80525

Attn: S. MORGENSTERN Tel: 484-3611

Attn:

Tel:

Email: SMORGENSTERM@SEHINK.COM

Email:

PROJECT INFORMATION

ANALYSES REQUESTED (required; attach list)

Client Project name and/or PO#:

RICO/ST. LOUIS PONDS

AARLO EOLW, 00,00011

Shipping Company:**Tracking #:**[illegible]

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)
--------	---

Options | SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

$A = \text{Cd, Cu, Pb, Mn, Ni, Se, Ag, Zn}$ | $C = \text{As, Cr, Fe}$ | $D = \text{Cr, Fe}$ | $F = \text{Cd, Cu, Mn, Zn, Pb, Ni, Se, Ag}$
 $B = \text{Cd, Cu, Fe, Pb, Mn, Ni, Se, Ag, Zn}$ | $E = \text{As, Cd, Cr, Cu, Mn, Zn, Fe}$ | $G = \text{Pb, Ni, Se, Ag}$

RELINQUISHED BY:

DATE:TIME

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DATE:TIME

PAGE

STEVEN MORGENSTERN

7-16-02 14:40

[Signature]

07/19/02 1030

Of

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

Steven Morgenstern

SEH

2637 Midpoint Drive Suite F

Fort Collins, CO 80525

August 16, 2002

Project: L37666

Steven Morgenstern:

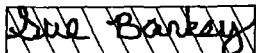
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 17, 2002. This project has been assigned to ACZ's project number, L37666. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 9.0. The enclosed results relate only to the samples received under L37666. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 16, 2002. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



16/Aug/02

Sue Barkey, Project Manager, has reviewed and accepted this report in its entirety.

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: RICO/ST LOUIS PONDS-

Sample ID: DR-4-SW

ACZ ID: L37666-01

Date Sampled: 07/14/02 15:25

Date Received: 07/17/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/12/02 22:02	ct
Calcium, dissolved	M200.7 ICP	9.2		mg/L	0.2	1	08/15/02 19:52	bf
Chromium, total recoverable	M200.8 ICP-MS	0.0014		mg/L	0.0001	0.0005	07/31/02 2:36	lcj
Copper, dissolved	M200.8 ICP-MS	0.001	B	mg/L	0.001	0.005	08/01/02 1:11	lcj
Iron, total recoverable	M200.7 ICP	0.12		mg/L	0.01	0.05	08/07/02 17:07	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	07/30/02 20:12	jb
Magnesium, dissolved	M200.7 ICP	1.1		mg/L	0.2	1	08/15/02 19:52	bf
Manganese, dissolved	M200.7 ICP	0.021	B	mg/L	0.005	0.03	08/15/02 19:52	bf
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/15/02 19:52	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:12	jb
Silver, dissolved	M200.8 ICP-MS	0.0002	B	mg/L	0.0001	0.0005	07/30/02 20:12	jb
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	08/15/02 19:52	bf

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 19:45	jb
Total Recoverable Digestion	M200.2 ICP						07/24/02 16:43	djm

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 11:30	kb
Hardness as CaCO ₃	SM2340B - Calculation	28		mg/L	1	7	08/16/02 9:42	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	340		mg/L	10	20	07/17/02 20:59	wfg
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	8	B	mg/L	5	20	07/17/02 22:25	wfg

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: RICO/ST LOUIS PONDS-
Sample ID: DR-28

ACZ ID: L37666-02

Date Sampled: 07/14/02 17:30

Date Received: 07/17/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/12/02 22:21	ct
Calcium, dissolved	M200.7 ICP	251		mg/L	0.2	1	08/12/02 22:21	ct
Chromium, total recoverable	M200.8 ICP-MS	0.0023		mg/L	0.0001	0.0005	07/31/02 2:41	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/01/02 1:16	lcj
Iron, total recoverable	M200.7 ICP	12.90		mg/L	0.01	0.05	08/01/02 20:02	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	07/30/02 20:17	jb
Magnesium, dissolved	M200.7 ICP	21.3		mg/L	0.2	1	08/01/02 12:43	kdw
Manganese, dissolved	M200.7 ICP	0.231		mg/L	0.005	0.03	08/07/02 21:08	kdw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/01/02 12:43	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:17	jb
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	07/30/02 20:17	jb
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	08/12/02 22:21	ct

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP						07/24/02 17:02	dln
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 20:00	jb

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Hardness as CaCO3	SM2340B - Calculation	715		mg/L	1	7	08/16/02 9:42	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1040		mg/L	10	20	07/17/02 21:00	wfg
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	344		mg/L	5	20	07/17/02 22:28	wfg

ACZ Laboratories, Inc.

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Inorganic Analytical Results

SEH

Project ID: RICO/ST LOUIS PONDS-

Sample ID: DR-26

ACZ ID: L37666-03

Date Sampled: 07/14/02 18:40

Date Received: 07/17/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/12/02 22:26	ct
Calcium, dissolved	M200.7 ICP	83.0		mg/L	0.2	1	08/01/02 12:47	kdw
Chromium, total recoverable	M200.8 ICP-MS	0.0014		mg/L	0.0001	0.0005	07/31/02 2:45	lcj
Copper, dissolved	M200.8 ICP-MS	0.001	B	mg/L	0.001	0.005	08/01/02 1:30	lcj
Iron, total recoverable	M200.7 ICP	0.16		mg/L	0.01	0.05	08/07/02 17:11	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	07/30/02 20:22	jb
Magnesium, dissolved	M200.7 ICP	10.4		mg/L	0.2	1	08/01/02 12:47	kdw
Manganese, dissolved	M200.7 ICP	0.229		mg/L	0.005	0.03	08/01/02 12:47	kdw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/01/02 12:47	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	07/30/02 20:22	jb
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	07/30/02 20:22	jb
Zinc, dissolved	M200.7 ICP	0.08		mg/L	0.01	0.05	08/01/02 12:47	kdw

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 20:15	jb
Total Recoverable Digestion	M200.2 ICP						07/24/02 17:21	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 11:32	kb
Hardness as CaCO ₃	SM2340B - Calculation	250		mg/L	1	7	08/16/02 9:42	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	330		mg/L	10	20	07/17/02 21:01	wfg
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/17/02 22:30	wfg

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Inorganic Analytical Results

SEH

Project ID: RICO/ST LOUIS PONDS-
Sample ID: DR-2-SW

ACZ ID: L37666-04

Date Sampled: 07/15/02 13:40

Date Received: 07/17/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/12/02 22:40	ct
Calcium, dissolved	M200.7 ICP	82.7		mg/L	0.2	1	08/01/02 12:50	kdw
Chromium, total recoverable	M200.8 ICP-MS	0.0013		mg/L	0.0001	0.0005	07/31/02 3:00	lcj
Copper, dissolved	M200.8 ICP-MS	0.002	B	mg/L	0.001	0.005	08/01/02 1:35	lcj
Iron, total recoverable	M200.7 ICP	0.12		mg/L	0.01	0.05	08/01/02 6:38	bf
Lead, dissolved	M200.8 ICP-MS	0.0002	B	mg/L	0.0002	0.001	08/01/02 1:35	lcj
Magnesium, dissolved	M200.7 ICP	10.3		mg/L	0.2	1	08/01/02 12:50	kdw
Manganese, dissolved	M200.7 ICP	0.210		mg/L	0.005	0.03	08/01/02 12:50	kdw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/01/02 12:50	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/01/02 1:35	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0003	0.001	08/02/02 4:40	lcj
Zinc, dissolved	M200.7 ICP	0.05		mg/L	0.01	0.05	08/01/02 12:50	kdw

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/26/02 20:30	jb
Total Recoverable Digestion	M200.2 ICP						07/29/02 11:14	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 11:33	kb
Hardness as CaCO ₃	SM2340B - Calculation	249		mg/L	1	7	08/16/02 9:42	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	330		mg/L	10	20	07/17/02 21:02	wfg
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/17/02 22:32	wfg

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

SEH
RICO/ST LOUIS PONDS-

ACZ Project ID: L37666
Date Received: 7/17/02
Received By: tinaw

Receipt Verification

- 1) Does this project require special handling procedures such as CLP protocol?
- 2) Are the custody seals on the cooler intact?
- 3) Are the custody seals on the sample containers intact?
- 4) Is there a Chain of Custody or other directive shipping papers present?
- 5) Is the Chain of Custody complete?
- 6) Is the Chain of Custody in agreement with the samples received?
- 7) Is there enough sample for all requested analyses?
- 8) Are all samples within holding times for requested analyses?
- 9) Were all sample containers received intact?
- 10) Are the temperature blanks present?
- 11) Are the trip blanks (VOA and/or Cyanide) present?
- 12) Are samples requiring no headspace, headspace free?
- 13) Do the samples that require a Foreign Soils Permit have one?

YES	NO	NA
		√
√		
		√
√		
√		
√		
√		
√		
√		
		√
		√
		√

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
ACZ	17.7	15

Notes

SEH
RICO/ST LOUIS PONDS-

ACZ Project ID: L37666
Date Received: 7/17/02
Received By: tinaw

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L37666-01	DR-4-SW	Y	Y							Y		
L37666-02	DR-28	Y	Y									
L37666-03	DR-26	Y	Y							Y		
L37666-04	DR-2-SW	Y	Y							Y		

TABLE 2
Analytical Procedures Summary

Parameter	Detection Limit	Method
Field Parameters		
pH (s.u.)	---	EPA 150.1
Temperature (°C)	---	Standard Method 2550
Conductivity (µmhos/cm)	---	EPA 120.1
Alkalinity (mg/L as CaCO ₃)	5 mg/L	EPA 310.1
General Parameters		
Hardness (mg/L as CaCO ₃)	1 mg/L	EPA 6010/130.2
Total Dissolved Solids (mg/L as TDS)	10 mg/L	EPA 160.1
Total Suspended Solids (mg/L as TSS)	5 mg/L	EPA 160.2
Trace Metals		
Arsenic (µg/L as As)	0.5 µg/L	ICP-MS
Chromium (µg/L as Cr)	.05 µg/L	ICP-MS
Cadmium (µg/L as Cd)	3 µg/L	ICP
Copper (µg/L as Cu)	0.5 µg/L	ICP-MS
Cyanide (µg/L as CN)	5-10 µg/L	Low-level WAD
Iron (µg/L as Fe)	10 µg/L	ICP
Lead (µg/L as Pb)	0.1 µg/L	ICP-MS
Manganese (µg/L as Mn)	5 µg/L	ICP
Mercury (µg/L as Hg)	0.000020 µg/L	EPA-1631
Nickel (µg/L as Ni)	10 µg/L	ICP
Selenium (µg/L as Se)	1.5 µg/L	ICP-MS
Silver (µg/L as Ag)	0.05 µg/L	ICP-MS
Zinc (µg/L as Zn)	10 µg/L	ICP

5.0 Flow Measurement Methods

Discharge measurements will be conducted in accordance with the measurement procedures used for the Rico site remediation as well as USGS standard discharge measurement procedures. Flows will be measured by one of three methods (1) a Marsh-McBirney Model 2000 portable flow meter, (2) Parshall flume, or (3) volumetric procedure using a 5-gallon bucket.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

Steven Morgenstern

August 16, 2002

SEH

2637 Midpoint Drive Suite F

Fort Collins, CO 80525

Project: L37719

Steven Morgenstern:

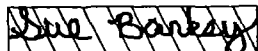
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 20, 2002. This project has been assigned to ACZ's project number, L37719. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 9.0. The enclosed results relate only to the samples received under L37719. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 16, 2002. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



16/Aug/02

Sue Barkey, Project Manager, has reviewed and accepted this report in its entirety.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: DR-20

ACZ ID: L37719-01

Date Sampled: 07/19/02 08:40

Date Received: 07/20/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	08/12/02 23:05	ct
Calcium, dissolved	M200.7 ICP	47.9		mg/L	0.2	1	08/07/02 1:43	kdw
Chromium, total recoverable	M200.8 ICP-MS	0.0001	B	mg/L	0.0001	0.0005	08/02/02 8:38	lcj
Copper, dissolved	M200.8 ICP-MS		U	mg/L	0.001	0.005	08/14/02 4:39	lcj
Iron, total recoverable	M200.7 ICP	0.09		mg/L	0.01	0.05	08/10/02 20:30	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/14/02 4:39	lcj
Magnesium, dissolved	M200.7 ICP	6.9		mg/L	0.2	1	08/07/02 1:43	kdw
Manganese, dissolved	M200.7 ICP	0.079		mg/L	0.005	0.03	08/07/02 1:43	kdw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/07/02 1:43	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/14/02 4:39	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/14/02 4:39	lcj
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	08/07/02 1:43	kdw

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 19:17	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 10:36	dlim

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:46	kb
Hardness as CaCO ₃	SM2340B - Calculation	148		mg/L	1	7	08/16/02 11:55	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	210		mg/L	10	20	07/22/02 10:16	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/20/02 17:51	wfg

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

**Inorganic Analytical
Results****SEH**

Project ID: AARCOE 0105.00.00011

Sample ID: DR-1

ACZ ID: L37719-02

Date Sampled: 07/19/02 10:10

Date Received: 07/20/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cadmium, dissolved	M200.7 ICP	0.003	B	mg/L	0.003	0.02	08/12/02 23:10	ct
Calcium, dissolved	M200.7 ICP	43.1		mg/L	0.2	1	08/07/02 1:48	kdw
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 8:43	lcj
Copper, dissolved	M200.8 ICP-MS		U	mg/L	0.001	0.005	08/10/02 6:05	lcj
Iron, total recoverable	M200.7 ICP	0.05	B	mg/L	0.01	0.05	08/10/02 20:34	bf
Lead, dissolved	M200.8 ICP-MS		U	mg/L	0.0002	0.001	08/10/02 6:05	lcj
Magnesium, dissolved	M200.7 ICP	6.3		mg/L	0.2	1	08/07/02 1:48	kdw
Manganese, dissolved	M200.7 ICP	0.013	B	mg/L	0.005	0.03	08/07/02 1:48	kdw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	08/07/02 1:48	kdw
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/10/02 6:05	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/14/02 4:55	lcj
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	08/07/02 1:48	kdw

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 19:31	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 10:55	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:47	kb
Hardness as CaCO ₃	SM2340B - Calculation	134		mg/L	1	7	08/16/02 11:55	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	190		mg/L	10	20	07/22/02 10:18	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	07/20/02 17:54	wfg

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID: AARCOE 0105.00.00011

Sample ID: SVS-26

ACZ ID: L37719-03

Date Sampled: 07/19/02 12:20

Date Received: 07/20/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, total recoverable	M200.8 ICP-MS		U	mg/L	0.0005	0.003	08/02/02 8:47	lcj
Cadmium, dissolved	M200.7 ICP	0.016	B	mg/L	0.003	0.02	08/12/02 23:15	ct
Calcium, dissolved	M200.7 ICP	125		mg/L	0.2	1	08/12/02 23:15	ct
Chromium, total recoverable	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/02/02 8:47	lcj
Copper, dissolved	M200.8 ICP-MS	0.051		mg/L	0.001	0.005	08/14/02 5:00	lcj
Iron, total recoverable	M200.7 ICP	14.80		mg/L	0.01	0.05	08/10/02 20:46	bf
Lead, dissolved	M200.8 ICP-MS	0.0407		mg/L	0.0002	0.001	08/14/02 5:00	lcj
Magnesium, dissolved	M200.7 ICP	22		mg/L	2	10	08/16/02 5:07	bf
Manganese, dissolved	M200.7 ICP	10.800		mg/L	0.005	0.03	08/12/02 23:15	ct
Nickel, dissolved	M200.7 ICP		U	mg/L	0.1	0.5	08/16/02 5:07	bf
Selenium, dissolved	M200.8 ICP-MS		U	mg/L	0.003	0.02	08/14/02 5:00	lcj
Silver, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	08/14/02 5:00	lcj
Zinc, dissolved	M200.7 ICP	8.05		mg/L	0.01	0.05	08/12/02 23:15	ct

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 ICP-MS						07/31/02 19:44	jb
Total Recoverable Digestion	M200.2 ICP						07/31/02 11:14	dln

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.005	0.01	07/25/02 10:50	kb
Hardness as CaCO ₃	SM2340B - Calculation	403		mg/L	1	7	08/16/02 11:55	calc
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	630		mg/L	10	20	07/23/02 14:52	lsa
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	6	B	mg/L	5	20	07/20/02 17:57	wfg

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

<i>Blanks</i>	Verifies that there is no or minimal contamination in the prep method procedure.
<i>Control Samples</i>	Verifies the accuracy of the method, including the prep procedure.
<i>Duplicates</i>	Verifies the precision of the instrument and/or method.
<i>Spikes/Fortified Matrix</i>	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

<i>B</i>	Analyte concentration detected at a value between MDL and PQL.
<i>H</i>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<i>R</i>	Poor spike recovery accepted because the other spike in the set fell within the given limits.
<i>T</i>	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
<i>U</i>	Analyte was analyzed for but not detected at the indicated MDL.
<i>V</i>	High blank data accepted because sample concentration is 10 times higher than blank concentration.
<i>W</i>	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
<i>X</i>	Quality control sample is out of control.
<i>Z</i>	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
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- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

SEH
AARCOE 0105.00.00011ACZ Project ID: L37719
Date Received: 7/20/02
Received By: TONYA**Receipt Verification**

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			√
2) Are the custody seals on the cooler intact?	√		
3) Are the custody seals on the sample containers intact?			√
4) Is there a Chain of Custody or other directive shipping papers present?	√		
5) Is the Chain of Custody complete?	√		
6) Is the Chain of Custody in agreement with the samples received?	√		
7) Is there enough sample for all requested analyses?	√		
8) Are all samples within holding times for requested analyses?	√		
9) Were all sample containers received intact?	√		
10) Are the temperature blanks present?	√		
11) Are the trip blanks (VOA and/or Cyanide) present?		√	
12) Are samples requiring no headspace, headspace free?			√
13) Do the samples that require a Foreign Soils Permit have one?			√

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (μR/hr)
ACZ	9.4	12

Notes

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

SEH
AARCOE 0105.00.00011

ACZ Project ID: L37719
Date Received: 7/20/02
Received By: TONYA

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L37719-01	DR-20	Y	Y							Y		
L37719-02	DR-1	Y	Y							Y		
L37719-03	SVS-26	Y	Y							Y		

Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

L37719: Page 8 of 8

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

Steven Morgenstern

October 30, 2002

SEH

2637 Midpoint Drive Suite F

Fort Collins, CO 80525

Project: L39055

Steven Morgenstern:

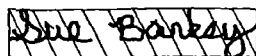
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 24, 2002. This project has been assigned to ACZ's project number, L39055. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 9.0. The enclosed results relate only to the samples received under L39055. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 30, 2002. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



30/Oct/02

Sue Barkey, Project Manager, has reviewed and accepted this report in its entirety.

SEH

October 30, 2002

Project: L39055

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 1 surface water sample from SEH on October 24, 2002. The sample was received in good condition. Upon receipt, the sample custodian removed the sample from the cooler, inspected the contents, and logged the sample into ACZ's computerized Laboratory Information Management System (LIMS). The sample was assigned ACZ LIMS project number L39055. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times.

Sample Analysis

This sample was analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports.

This report reflects the retest analysis of Dissolved Calcium, Magnesium, Manganese and Zinc for sample L37666-01. The retest results do not verify the original results. There appears to be a dilution factor error in the original analysis. There will be no charge for the re-analysis.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Inorganic Analytical Results

SEH

Project ID:

Sample ID: DR-4-SW

ACZ ID: L39055-01

Date Sampled: 07/14/02 15:25

Date Received: 10/24/02

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	97.8		mg/L	0.2	1	10/28/02 23:22	ct
Magnesium, dissolved	M200.7 ICP	11.0		mg/L	0.2	1	10/28/02 23:22	ct
Manganese, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	10/28/02 23:22	ct
Zinc, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	10/28/02 23:22	ct

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Hardness as CaCO3	SM2340B - Calculation	290		mg/L	1	7	10/29/02 17:03	calc

Note: This report is for the re-analysis of the sample previously reported as ACZ project L37666-01.

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
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